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Journal of Forestry

Official Organ of the Society of American Foresters

Editorial

A Tribute to Loyalty and Service

HARDY L. SHIRLEY has completed three years as editor-in-chief of the JOURNAL OF FORESTRY. In submitting his resignation to the Council, he wrote, "As you can well appreciate, it has taken a great deal of my time and energy to carry this extra burden, time which should have been devoted to my duties at the College of Forestry and time also that should have been devoted to professional reading and advancement." With full agreement that he had earned the right to pass the responsibility on to another, but nevertheless with regret at his decision, the Council reluctantly accepted the resignation.

Last fall Dr. Shirley made a rough estimate of the time required to get out one issue of the JOURNAL. It amounted to 40 hours. Thus during the past three years, he has devoted to the Society approximately 1440 hours, or the equivalent of 180 eight-hour days, serving gratuitously as editor-in-chief. This is not an inconsiderable contribution.

In acknowledging it, the Society is indebted not only to Dr. Shirley for shouldering the burden of this heavy work load. But also the Society is indebted to the New York State College of Forestry at Syracuse University for having made it possible for Dr. Shirley to carry out the assignment.

The personal influence of an editor of a professional magazine is a very subtle thing, difficult to appraise, and almost impossible to explain. To understand the influence exercised by Hardy Shirley during the past three years on the profession of forestry, one must understand something of the man himself. When he assumed the editorship in 1946, he was approaching the height of a professional career which had begun with teaching, included research assignments leading to the directorship of one of the great federal forest experiment stations, and had reached the assistant deanship of the largest college of forestry in the world. In addition, he had contributed widely to the literature of forestry through periodical articles and other publications. Moreover, he was not without administrative knowledge about the operations of the Society, for he had served as chairman of the Minnesota (now the Upper Mississippi Valley) Section, and as a member of the Council.

Thus he brought to the editorship a wealth of forestry experience and a maturity of professional development which particularly qualified him for the important role he was to play during the ensuing three years. But it was characteristic of him to enter the new assignment with an humble attitude, even self-deprecatory, yet determined to sustain the high standards of former editors.

HARDY L. SHIRLEY

Of them he wrote, "The JOURNAL has been brought to its present state of professional and literary excellence largely through the unselfish devotion of past editors. The new editor cannot presume to match the long and distinguished service of Bernhard Fernow, the imaginative leadership or social vision of Raphael Zon, the dynamic zeal of Emanuel Fritz, the scholarship and literary excellence of Herbert Smith, the versatility of Henry Schmitz, or the erudite statesmanship of Samuel Dana. To these men the Society owes much. They made the JOURNAL a recognized medium for disseminating technical information and a forum in which vital issues confronting our profession could be fairly debated. To sustain this tradition the new editor pledges his utmost effort."

Now at the conclusion of his three-year stint, most constant and careful JOURNAL readers would doubtless concede that Hardy Shirley has earned for himself a place among that distinguished company of past editors whose performance he pledged himself at the outset to emulate but hardly dared hope to match.

Because Hardy Shirley's editorial services and contributions have been more diversified than is apparent to the casual reader, it is not easy to fix upon the precise effect of his personality on the JOURNAL. But his influence has been substantial, even if not always evident, in at least two directions. In the first place, perhaps as much as any previous editor, he made the JOURNAL an organ for presenting vital issues confronting the profession. Secondly, his editorials generally reflected an optimism about the future of forestry which was all the more contagious in that it was based on an informed realization of the obstacles and deterrents in its path.

It is questionable whether Hardy Shirley ever wrote an editorial, or any part of one, simply to please some group within the profession. On the contrary, his editorials occasionally exasperated some readers by criticizing, though never disagreeably, aspects of the forestry program which he believed were lagging. But in the main, he was anxious to give credit for good accomplishment, and many of his writings provided welcome aid and comfort to readers who saw his editorials reflect their beliefs, interests, aspirations, and ambitions. His last editorial in the April issue, "As Our Profession Grows," is a calm affirmation of faith in forestry which every thinking forester can ponder with advantage.

There is an engaging human side to Hardy Shirley of which many readers, who know him only from the somewhat impersonal viewpoint of the editorial page, have been little aware. It is perhaps best characterized by the trait of unruffled tolerance. In the face of criticism, and even of attack, he defends his opinions with urbanity and good humor. Always eager to give full weight to an opposing point of view, he published in the JOURNAL numerous statements taking exception to his own. At times he even seemed to derive a wry sort of satisfaction from publishing some comment which he knew in advance would be unpopular but which would challenge readers to think.

Implicit in every line Hardy Shirley ever wrote is a quality which might be considered the distinguishing attribute of the man as well as of the editor. This, in a word, is his deep sense of obligation. A characteristic fortunately rather common in the world, it is the hallmark of scientists and professional men generally; for example, physicians have it to a high degree. Obligation, as used here, is not easy to define; we might call it the sense of duty which binds one to continuous supreme effort in behalf of social progress, professional development, and the improvement of mankind. In Hardy Shirley it is so evident as a trait of personality that he can almost be said to exemplify it for the forestry profession.

The inexorable recurring obligations of a monthly 80-page magazine are not to be assumed lightly or discharged with ease. Hardy Shirley worked hard at the job, and sacrificed much of his leisure time over a period of three years in doing it. When his last editorial was written and the last manuscript edited, he doubtless sighed (to paraphrase Shakespeare), "For this relief, much thanks."

So now, the Council in behalf of the entire Society herewith expresses its gratitude to him for a job well done. In addition, it desires to acknowledge the valuable assistance given him by his colleagues at the College of Forestry, by graduate students who from time to time helped with numerous chores, by his competent secretary Miss Genevieve Reidy, and finally by the faithful editorial board which fortunately is staying on.

Hydrological Relationships Between Forests and Other Types of Land Use in Italy[1]

Walter J. Quick, Jr.

American forester in Italy, formerly assigned by the Agriculture Division of the Food and Agriculture Organization of the United Nations to assist the Italian Ministry of Agriculture and Forestry in execution of forestry rehabilitation projects.

Current uses of Italian forest areas do not generally recognize their prime importance as protection forests, in contrast to their other valuable services to mankind. A protection forest has frequently been defined in the technical literature as an area wholly or partly covered by woody growth, managed mainly for its beneficial effects on water or soil movement rather than for wood or forage production. Italian technicians have expertly used reforestation as an effective means for stopping serious soil erosion, for correcting landslides, and for stabilizing steep slopes. However, there has been too little emphasis in Italy upon the need for conserving moisture and water supply through the establishment of new forests, the retention and maintenance of forests following their establishment, and the application of modified management to such forests. The systemization of Italian mountain basins has become a highly developed technique, with expensive engineering works to restrain destructive water and soil movement. Reforestation has played an important part in such undertakings, but generally limited to soil stabilization rather than performed for regulation of the water supply. To function effectively, protection forests require special management which should be applied in all arid mountain areas where increased moisture is needed.

THERE is much evidence to support the belief that reduction of forest area and degradation of forests through improper management has retarded the general rise in productivity of Italian croplands, attained through progress in scientific agriculture. Although an over-all increase in production of some of the more important crops resulted from a remarkable increase in productivity of the better farms prior to the war, production on large areas of poor mountain lands in central and southern Italy has declined or been maintained only by inordinate labor and dissipation of land resources. In addition to these great efforts, which have too often been unsuccessful, there has continued to be an ever-expanding cultivation of steep, stony, sterile, and arid soils.

This trend towards the increasingly difficult cultivation of poor lands has been due to the demand for larger quantities of food, fibre, fuel, and wood by a dense and constantly increasing population. Obviously, this constitutes a population pressure upon Italian land resource, which has produced a critical maladjustment in land use, very difficult to correct as long as the intense use of the land persists. Ordinary methods of land improvement applied in Italy bring an increased production of human needs, but this is only a temporary advantage. Because of failure to make major changes in the types of land use, the improvement is followed by further intensification of the same uses, leading in the end to further long-term exhaustion of the land resource, while the needs for production continue to rise due to increasing population.

Such intensive use of these poor mountain soils cannot continue indefinitely for one major reason: the serious disturbance of normal hydrologic relationships between forests, grazing lands, and cultivated areas. Frequently without an adequate knowledge of recent scientific developments for continuously conserving moisture, soil, and organic resources, the owners or farmers on small mountain properties have increasingly applied the tried and tested methods for temporary conservation of land resources. Thus, painstakingly, they have changed the appearance of their countryside through great labor, but have often upset rather than maintained the most desirable balance of land uses.

Possibility of Better Land Use

On lands too steep to retain the soil when cultivated, Italians have erected stone walls to support the narrow terraces of cropland; on land too compact and sterile to support thrifty plant life, they have resorted to tremenduously deep ploughing to loosen the soil, to increase the infiltration of water, and to permit the penetration of roots to be fed by chemical fertilizers; on land too dry to permit statisfactory plant growth, they have brought water by means of ditches and lengthy masonry aqueducts; on lands too stony to permit productive cultivation or grazing by livestock, they have performed stupendous feats of stone removal or transportation of soil from bottomlands or from deep pockets in the earth to cover the stones. This resort to physical modification of the land's configuration as a means of reclamation approaches

[1]Somewhat modified from a paper presented on September 16, 1948, at the Soil Conservation Meeting held by the Food and Agriculture Organization of the United Nations, participated in by forestry and soil technicians of the European nations, held at the "Accademia dei Georgofili" at Florence, Italy.

the utmost exploitation of the land, gaining a few decades or maybe a century of hard-earned use, but at great loss to future generations through ultimate removal of many areas completely from human use. The thrifty and hard-working Italian people are lauded for their tremendous expenditures of effort in performing these impressive works, which in themselves are commendable. Nevertheless, they are accomplished with little thought or knowledge of the long-time needs of each area in assuring a permanent supply of moisture and water for all times in the future. This is largely because the users of the soil are too preoccupied in the daily struggle for existence to be concerned with future productiveness affecting the lives of unborn generations.

Man-induced erosion and constantly increasing aridity are the resulting conditions, gradually destroying the land itself. Yet, this destruction is not generally recognized by the people who are exerting such great effort to earn a living from the soil, and the Italian technician or public administrator is prone to argue that nothing very satisfactory can be done about it because of the tremendous pressure of social problems and the need for maintaining human life. Perhaps this may be true if Italy must be restricted to her rugged peninsula and adjacent islands, without hope of outside relief through emigration or the expansion of imports to supply many of the needs for which the land is exploited. However, with world collaboration and the interest of civilization in Italian progress and welfare, there may be an opportunity for a more effective approach to permanent rehabilitation of the Italian mountain areas.

Harmful Practices

Past efforts have been inadequate because land-use adjustment problems were approached only piecemeal while intense use continued, rather than through complete revised-use planning of entire districts or watersheds (Fig. 1). It is remarkable that the intense use can continue after centuries of increasingly severe exploitation and abuse of Italian mountain areas. In many sections the remaining soil is being used intensively even after the forests, or most of them, have been removed from the mountains, practically all organic material has been lost from the soil except in deep valleys or on small plateaus, and much of the soil itself has eroded from the mountain tops and more prominent lateral ridges (Fig. 2). In such areas the wet winters and dry summers present contrasting conditions of excess runoff of water from the steep slopes, followed by extreme drought in the growing season when all plant life withers and dies. During the winter season, raging waters rush from the mountains and carry soil, gravel, and rocks onto lower cultivated areas; tearing hungrily at stream banks and exposed farmland, they surge in uncontrollable volume onto the coastal plains, damaging productive lands and destroying life, property, and structural improvements. Even more important to the mountain dweller is the summer season, when his crops fail due to drought, mountain springs and streams dry up, and mountain grasslands become parched and inedible; then the livestock migrate in droves or survive where they are in a semi-starved and worthless condition. Thus, although the Italian farm worker labors mightily, he is discouraged by the seeming futility of his efforts when opposed by the destructive forces of unfavorable weather conditions; he little realizes that he has destroyed his best ally, the

FIG. 1.—Italian technicians have expertly used reforestation as an effective means for stabilizing steep slopes: vicinity of Monte Pomaro, head of Zavianni Torrent, Messina Province, Sicily. August 10, 1948.

FIG. 2.—In many sections of Italy the remaining soil is being used intensively after practically all organic material has been lost and much of the soil has eroded away: Monte Callea, headwaters of Fossa dell'Annunziata, Reggio Calabria Province, Italy. August 6, 1948.

FIG. 3.—Fifteen-year old chestnut standards and a pile of fagot wood cut from an Italian coppice forest: near Montereale, Aquila Province, Italy. August, 1947.

forest, so useful in moderating the ill effects of weather extremes.

For over half a century, there has been official recognition in Italy of the need for keeping existing forest areas forested: legislation and regulations forbid the cutting of forests without replanting or natural regeneration through protection of coppice growth from grazing. However, the pressure for more and more grazing lands and the harmful grazing next to newly planted or cutover lands tends to destroy the small trees. As a result the range lands increase and the forest lands decrease in size. Also, the pressure for more and more fuel causes the broadleaved forests and many of the coniferous forests to be cut at a very young age, followed by reforestation or by coppice regeneration. Many such forests in the Italian mountains are cut every 8, 10, or 15 years to produce charcoal or fagot wood, and few forests used for fuel are permitted to reach 25 to 35 years of age (Fig. 3). This means that they are kept from full effectiveness in the absorption and conservation of moisture and the facilitation of water infiltration to supply underground channels. This important function of forests is not too well appreciated in Italy, though the binding effect of surface tree roots in conserving soil is acknowledged and effectively used in reclaiming severely eroded areas. But Italian experiments

and publicity are needed to demonstrate the important results of research in the United States and other countries, confirming the beneficial influences of forest vegetation.

What the Forest Can Do

The key to the forest's influence on surface and underground waters lies in the forest litter, duff, and humus, which include the carpet of dead leaves, twigs, small branches, bark, and decomposed organic material on the ground, and underlying layers of the same material in varying degrees of decomposition. The impact of water falling as rain on exposed soil without such ground cover dislodges particles of clay and silt which wash into the tiny pores and channels of the soil as the water soaks downward. These openings clog; water can no longer move downward through the soil and instead rushes over the surface, carrying with it the looser particles and causing active erosion of the soil. But a protective layer of litter, duff, and humus prevents this action by absorbing the impact of the falling rain. After the ground cover is soaked, excess water trickles into the mineral soil below; the water remains clear and free of sediment. Under these conditions water can penetrate deeply into the underground channels, surface flow is eliminated except in periods of long-continued rain, and underground reservoirs are replenished to feed springs and capillary water supplies.

When this process is understood, it can be appreciated why so many rugged Italian watersheds with little or no forest land become severely parched and without a trickle of water in their streams in summer, while erosion becomes cataclysmic, and every ravine and stream channel becomes a raging torrent in winter. No land can prosper long under such conditions, and all our scientific knowledge is needed if such areas are to be reclaimed and retained for permanent human use. This means learning what minimum areas must be reforested to bring about essential moisture control, what modifications in forest management are needed for optimum water absorption and conservation, and what nationally and internationally aided social adjustments must be accomplished to relieve the pressure for excessive land use.

Desired Techniques and Adjustments

Reasonable restoration of forests to many mountain areas and modified management of existing forests could be expected to result in remarkable changes in waterflow and moisture conservation. The areas removed from grazing or crop production could easily be offset by the greater productivity of the remaining areas provided with a better-regulated moisture supply; while the lowered production of fuel from the less heavily cut existing forests would soon be restored by production from the reforested areas. Ideally, forests should occupy the poorer, more-exposed, and steeper sites, interspersed by moist, well-protected meadows and small mountain farms on the plateaus, mountain benches, and gentle slopes. However, it takes time for forests to grow and management changes to establish their influence; a lowered production of crops and products of the forests and grazing lands is inevitable for some years after areas are reforested or frequent cutting is stopped. It is for this reason that social pressure prevents withdrawal of poor lands for reforestation and reductions in the intensity of forest utilization.

On areas without conflicting human interest to contest a change in land use, Italian technicians and social planners have accomplished marvels of land reclamation. Examples are the restoration of steep, severely gullied clay lands where all human use had ceased (Fig. 4) and the drainage and development of tidal marshes frequented only by transient hunters and fishermen. If a way can be found temporarily to reduce the pressure of human needs on selected mountain areas, it should be possible to restore the balance between moisture and forests, mountain pastures, and cultivated lands. This would be the means for preventing the ultimate destruction of productivity of entire mountain districts. Italy has tremendous needs for timber and fuelwood, for control of soil erosion, and for industrial employment of her people in the manufacture of commodities to be made from wood. This emphasizes the need for forests and the production of large enough timbers to provide a source of material for manufacture. It should be more generally recognized that Italy needs high forests or coppice selectivity cut on longer rotations, as contrasted to frequently cut brushlands exposed by clear-cutting to the sun's drying effects on the soil.

Reforestation techniques, selection of suitable species, and knowledge of specific soils and climatic zones have been well developed in Italy. Nevertheless, much remains to be learned on the water-consuming and moisture-conserving characteristics of individual species. It is well recognized, too, that direct seeding is to be preferred

for certain species on specific soils and in certain climatic zones, while the planting of seedlings is required in arid soils and zones. On the drier planting sites success is possible only through careful preparation of the site and by using transplants with their roots balled in earth (Fig. 5). Because Italian manpower has been cheap and plentiful, past reforestation has been done entirely by hand and without regard to the amount of labor expended. As compared to prewar conditions, less available funds in proportion to the cost of labor is bringing about the study of less expensive means for reforestation. It is possible that there will be more planting failures because the cheaper, less-painstaking techniques will be used increasingly on sites

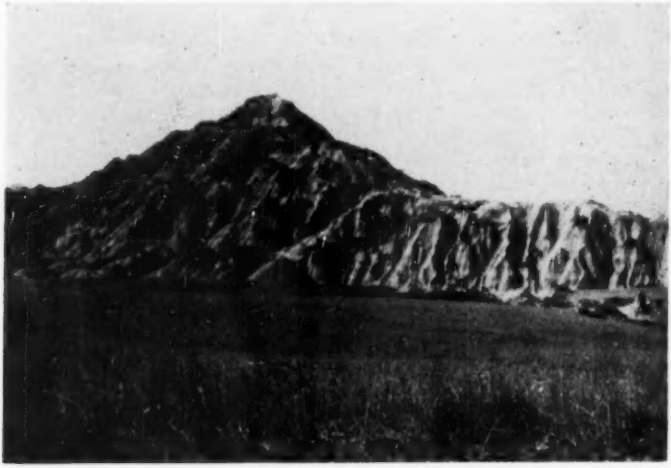

FIG. 4.—Steep, severely gullied clay land in Italy where all human use has ceased and where exploitation of the land started in the dawn of history: near Melito di Porto Salvo, Reggio Calabria Province, Italy. August 7, 1948.

FIG. 5.—On the drier Italian sites, careful advance preparation and use of transplants with their roots balled in earth is necessary for successful reforestation: near Messina, Sicily. August 8, 1948.

which are too dry for them. More attention is being given since the rise in the cost of labor to experiments with specialized hand tools and motorized equipment, so as to increase accomplishment with available funds.

Reforestation and Social Clash

The Committee on Forest Terminology of the Society of American Foresters has defined watershed management as the administration and regulation of the aggregate resources of a drainage basin for the production of water and control of erosion, streamflow, and floods. When natural vegetation is protected from fire, grazing, and excessive cutting, it is usually adequate in controlling erosion, in the stabilization of steep slopes, and in reducing flood damage to a minimum. However, scientists are generally agreed that forests without modified management are not so effective as they might be in enabling the production of a maximum yield of usable water or in maintaining more humid conditions within a drainage basin. In his publication on *Forest Influences,* Kittredge says that the management of a watershed usually progresses through four stages. The first is the preparatory or organizational stage, which involves study of the extent, location, and severity of harmful and destructive use. The second stage consists in the rehabilitative work to be done in overcoming damage and in changing the use of critical and misused areas, which includes engineering works and reforestation. The third stage involves the continued regulation of use and maintenance of stabilized conditions consistent with the continued major uses of the watershed. The fourth stage is the further improvement and wise utilization of benefits accruing from management of the watershed, which should include the initiation of practices intended to increase the water-conserving ability of the forest. The preparatory and regulatory stages of watershed management are not too difficult because they do not conflict with current use, but the rehabilitative and improvement stages bring about social clash due to required changes and modification of forest and grazing practices. It is in these respects that national and international assistance is necessary in removing the social pressures that prevent a permanent solution of watershed problems.

Conclusion

In bringing about the needed changes in Italian land use, international collaboration can be helpful by providing imports of fuel and timber which will relieve the too-rapid cutting of Italian forests, and by absorbing planned emigration of people from mountain zones where reforestation is a necessary phase of rehabilitation. In this manner, it is believed that Italy's production of crops, range animals, and much-needed timber products eventually can be increased with resultant ability to provide a higher standard of living for her multitudes. The attainment of this ideal requires cooperation and broad understanding of objectives on international and administrative levels as well as in the technical field, in order to effect the necessary social adjustments. Without these, the continued decline in productivity of Italian mountain areas appears inevitable. With intense grazing gradually destroying plant life on the poorer areas, the accompanying severe erosion will mean exposure of larger and larger areas of bare rock where once forests or productive farm lands existed. This has been the trend in all the older centers of civilization of the world, but the opportunity still exists for creating a new trend for ancient centers of civilization in the Italian mountains.

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Comments

Professor Aldo Pavari[1]

I JOIN Professor Passerini in congratulating Mr. Quick for having shown in his interesting report a complete understanding of the complex Italian forestry problem, both from the hydrogeologic and the economic points of view.

He also concludes that the major difficulties in the solution of this and other Italian problems are due to over-population in a narrow land, which is poor by nature and has been even more impoverished through thousands of years of intense exploitation. Under these conditions it is very difficult to extend protective forests, as would be necessary for a better hydrogeologic control of Italian mountains, as the lecturer has rightly pointed out.

But I must say that Italy holds an old preference for a method of high forest management which is satisfactory not only from the point of view of productivity but also of hydrogeologic control; that is the selection method, which goes back to the wise legislation of the Venetian Republic. It is due to this reason and to the results of research carried out especially in Switzerland and America on the usefulness of selection forests in regard to moisture storage that I have for some time pointed out the danger we should run through replacing our precious uneven-aged forests with even-aged forests in the Alps.

In regard to the low efficacy of Italian coppice forests from the hydrogeologic point of view, which is even more evident when rotations are shorter and the density of the forest is low owing to improper management and grazing, I shall recall that I have already demonstrated that in Italy the prevalence of coppice over high forests must not be considered too pessimistically and interpreted as a backward peculiarity of our silviculture, because a variety of physical, economic, and social influences brings about such a prevalence. It is enough to think of our lack of fossil fuels, such as petroleum and coal, to understand the necessity of substituting fuelwood for them, the production of which is from every point of view more convenient under coppice management than under high forest management; and, we may also think of the prevailing private ownership of our forests, and of its parcelling out in small areas, in order to understand that coppice management is the only one possible under present conditions. Anyway, I perfectly agree that it is necessary to lengthen to the utmost the coppice rotations; but not beyond the limits imposed by the sprouting capacity of the forests.

The general principles of our silviculture, supported also in local regulations, aim precisely towards this objective. Another tenet unanimously accepted is that of converting our coppice areas into coppice with standards, and also to include the introduction of conifers.

In regard to the systemization of mountain watersheds, the harmonious proportion of forests, cropland, and grazing lands and the application of rules which will increase their efficiency from the point of view both of productivity and hydrogeologic control: this is a problem already thoroughly studied, but we agree with the lecturer that unfortunately it has not yet been solved; and following the forestry congress held here at Florence in 1947, positive proposals have been put forth from this academy for the immediate execution of standard plans for hydrogeologic watershed developments, the most important objective of which is precisely that mentioned above.

In regard to the economy of our reforestation techniques and their quick results, I cannot enter into details. In this field much progress has been accomplished, but much must still be attained; and, I remember that FAO will organize next December a meeting of foresters who will examine the complex forestry problems of the Mediterranean Basin.

In conclusion, on the one hand technical improvements must be sought, but on the other hand, conspicuous funds are necessary in order to solve such important and complex problems which are strictly bound to the productive and social organism of the nation. Let us, therefore, rely on large international assistance, to which the lecturer has alluded, but let us not be blind to the wide difference between necessity and actual possibility. Confining ourselves to the technical field, we should welcome with the greatest pleasure international assistance for carrying out a proposal that I have made: that is the establishment of experimental mountain watersheds for studying works and vegetative covers capable of accomplishing the best hydrogeologic and productive organization of the watersheds in some of the most typical areas of the Italian mountains. This would be a first and important step towards the attainment of our difficult objective.

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Poisoning Southern Upland Weed Trees

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The "Ammate method" of poisoning weed trees has found increasing application on forests and ranges in the South and elsewhere during the past 2 years. This article describes improvements in the method, and briefly reports experiments comparing Ammate with sodium arsenate and 2,4-D.

UBIQUITOUS but unwanted, weed hardwoods occupy millions of acres of forest and range land in the South. Their widespread occurrence has been fostered by a sequence of heavy cutting and by fire which has tended to increase consistently the proportion of undesirable trees and species. Now their control is sought by many foresters, range men, and other land managers, each for his own specific purposes.

Scrub oaks make up the major part of the offending species and are difficult to control at reasonable cost. Cutting or girdling is suitable where subsequent sprouts are of little or no concern, or on large trees 10 inches d.b.h. and up, which often do not sprout seriously. More often, a kill not only of the crown but also of the roots is desired, so that fast-growing new sprouts will not occur to compete with natural or planted young pines, crowd out range forage plants, or clutter up landing fields or rights-of-way. Poisoning has been found to be one of the best methods of getting a rapid and complete tree kill at economical cost and at the same time inhibiting new sprout growth.

Experiments in poisoning low-value hardwoods were started by the Southern Forest Experiment Station in 1929. These experiments, which are still continuing, have tested a wide variety of poisons and several methods of application. Recent studies, summarized in this article, have tested new poisons and have determined the best season for treatment, dosage, and costs. The most comprehensive tests have been made on blackjack oak with ammonium sulfamate (80 percent ammonium sulfamate crystals sold under the trade name Ammate), but tests have been made on other species and with other chemicals in current use.

The Best Poisons

Ammate is the most effective poison found so far for treating upland hardwoods. In the past 2 years it has been used for timber-stand improvement work on thousands of acres in the South. Sodium arsenite is nearly as effective as Ammate, except in winter, but it is hazardous and difficult to use.

Upland hardwoods poisoned with Ammate die as quickly and as surely as when treated with sodium arsenite, and are considerably less likely to send up new sprouts from the base (*2*). Ammate can be used to spray areas where young sprouts are too small or numerous to be treated safely with sodium arsenite. It does not harm either humans or livestock, while sodium arsenite is a deadly poison. Ammate is not a cure-all, however, because on bottomland hardwoods sodium arsenite appears to be the better poison of the two.

Creosote, Diesel fuel, copper sulfate, zinc chloride, sodium chloride, sodium nitrate, potassium nitrate, and ammonium nitrate have been found to give only a poor kill of trees and sprouts.

Compounds of 2,4-D have given varied results (*6*); but show enough promise, when sprayed on sprouts in concentrations up to 8 percent, to justify further work.

Method and Season of Application

Holes punched at the base of the tree are a fairly good way of applying poison (*7*). However, "cups" chopped into the trunk near the ground allow a larger and more effective dosage. Cups are chopped simply by making two downward ax cuts, one above the other, and prying out the chip. Poison put in frills at a height of 6 inches or more effectively kills tree crowns, but allows considerably more basal sprouting than where cups are used. A frill is a single-hack girdle, made by cutting once around the tree with overlapping, downward strokes of the ax. Cups should be placed on the main roots or as close to them as possible, and frills should be as low on the trunk as they can conveniently be chopped. Low cups and frills minimize sprouting because the poison works upward very readily, killing live tissues and buds. The poison works downward less easily, but when it is applied low on the tree enough gets into the base and roots to retard sprouting

there. Studies with mesquite (*3*) have shown that the dormant buds on the underground stems must be destroyed in order to kill the plant, and this finding seems to have some application in poisoning southern hardwoods.

Cutting the tree and immediately spreading Ammate over the stump is also effective in preventing sprouting. Sprouts can be set back by spraying the leaves or pouring the chemical into a shallow basin in the soil around the stem, but both methods are usually too expensive to use on a very large scale in the South.

"Cup" treatment.—Table 1 shows the effect of sodium arsenite and Ammate when applied in cups at various seasons on blackjack oaks in central Louisiana. It should be noted that poison applied in April and July 1946 had one more growing season to react than treatments made during October 1946 and January 1947.

These treatments show that Ammate crystals applied in cups at ground level are effective on blackjack oak at any season. Crown kill was slightly less complete and sprouting somewhat more abundant from fall treatments than from those at other seasons. Placing Ammate in cups 30 inches above the ground was effective in winter, but at other seasons the crowns died slowly and low sprouting was vigorous. Ammate could also be effectively applied to small stumps during any season, but basal sprouting was most vigorous from spring treatments.

Ammate apparently is cumulative in its effect. It eventually killed blackjack oaks regardless of the season of application. For example, the crown kill from applying a 19.3 percent solution (2 pounds of Ammate per gallon of water) into frills in April 1946 increased from 41 percent in September 1946 to 100 percent in July 1947; and 78 percent of the basal sprouts which came out in 1946 were dead in 1947.

Sodium arsenite gave only a 42 percent crown kill when applied in cups in winter. At other seasons, crown kill from sodium arsenite was as much as from Ammate, but basal sprouting was much more abundant and vigorous. With sodium arsenite the best combination of good crown kill with retardation of sprouting was obtained from the spring application. As with Ammate, sprouting was most abundant from the fall treatment.

Frills.—A 32.4 percent solution of Ammate (4 pounds of Ammate per gallon of water) applied in low frills (about 6 inches above the ground) in spring and winter killed 98 and 91 percent of tree crowns respectively, as compared to 63 percent for July applications and 54 percent for October. Sprouting was most luxuriant from the spring and fall treatments.

A one percent solution of ammonium 2,4-D acetate[1] effected a 99 percent crown kill of blackjack oaks when applied in frills during the spring. Basal sprouting was less for spring treatments than for summer or fall applications. Strong solutions have given better results on woody species than the weaker solutions recommended for herbaceous plants. For instance, a 2 percent solution of ammonium 2,4-D acetate applied in frills gave a 93 percent crown kill

[1]Ammonium 2 4 dichlorophenoxyacetate.

TABLE 1.—EFFECT OF SEASON OF APPLICATION OF CHEMICALS IN LOW CUPS ON BLACKJACK OAKS 4 TO 8 INCHES D.B.H.[1]

Season of treatment	Crown kill		Basal sprouting		
	Average all trees	Trees with complete kill	Trees with new sprouts	Average per tree	Average height of sprouts
	Percent	*Percent*	*Percent*	*Number*	*Inches*
			Ammate crystals		
April 1946	98.4	80	20	0.5	3.2
July 1946	98.4	40	0	0	0
Oct. 1946	96.2	0	70	2.6	2.8
Jan. 1947	99.6	80	30	.7	2.2
			61.5 percent sodium arsenite solution		
April 1946	94.8	70	70	2.9	8.9
July 1946	93.5	30	60	3.1	16.8
Oct. 1946	93.4	40	80	3.6	15.0
Jan. 1947	41.7	11	33	1.1	6.0

[1]Basis: at least 10 trees per treatment unit; examined July, 1947.

in July as compared with a 59 percent kill for a 1 percent solution.

Spray.—The effect of sprays on blackjack oak sprouts also appears related to season. Crown kill was almost complete for spring spray treatments with 19.3 percent and 32.4 percent Ammate. Fall applications gave a lower percent crown kill and more prolific and vigorous resprouting. However, the stronger solution was effective any time during the year while the foliage was green. Spraying with 1 percent 2,4-D effected a much better crown kill during spring than for any other season, a result in keeping with the findings of many other agricultural workers that 2,4-D is most effective on plants in active growing condition. However, basal sprouting was abundant from this treatment.

The blackjack oak sprouts used in these studies were mostly 2 years old. There are definite indications that sprays, particularly 2,4-D, are most effective on first-year sprouts.

Species

Upland hardwoods vary in their resistance to poisoning. Sweetgum and blackgum are easy to kill by applying Ammate crystals in cups. Blackjack oak, most of the scrubby oaks, elm, ash, and ironwood are intermediate in their susceptibility. Some species, such as hickory, beech, persimmon, and white oak, require a heavier dose and die more slowly than the others.

Sweetgums in central Louisiana treated with Ammate crystals in cups in August 1946 died quickly and had practically no sprouting a year later (Table 2). A few green leaves remained on blackjack oaks treated in August 1946 when they were examined in July 1947, and there was some basal sprouting. Hickory trees given a double dose of Ammate in August 1946 died slowly but had less than 15 percent crown cover 1 year later and no basal sprouting. If a complete crown kill without regard to sprouting is all that is desired, it can be effected more quickly on all these species by applying Ammate in frills than in any other way. The spray works about as well on sprouts of most species of upland hardwoods as it does on blackjack oak sprouts.

Certain bottomland species growing along creeks are sometimes included in upland control operations. Among these species, bay and willow are easily poisoned with Ammate in cups. In contrast, other bottomland hardwoods, among them bitter pecan, are more easily killed with sodium arsenite, though Ammate ranks a close second (*4*). The relatively weak solutions of 2, 4-D used thus far have not achieved an efficient kill on bottomland hardwoods.

Dosage

Present recommendations on upland hardwoods are to apply 1 tablespoonful of Ammate crystals per cup for trees low and intermediate in their resistance to this chemical. A double dose per cup is recommended for the more resistant species such as hickory. Cups should not be spaced more than 6 inches apart around the base of the trunk. Two cups are enough for trees up to 6 inches d.b.h. Larger trees need an additional cup for about every 2-inch increase in d.b.h.

Trees under 4 inches d.b.h., too small to cup, should be cut close to the ground so as to leave a V-shaped stump. Apply 1 tablespoonful of Ammate crystals immediately to the freshly cut stump. Ammate is hygroscopic and usually is taken up by the tree within 24 hours. If much time is allowed to elapse before applying, very little of the poison will be absorbed.

TABLE 2.—EFFECT OF AMMATE CRYSTALS ON DIFFERENT SPECIES WHEN APPLIED IN LOW CUPS[1]

Species	Crown kill		Basal sprouting		
	Average all trees	Trees with complete crown kill	Trees with sprouts	Average per tree	Average height
	Percent	*Percent*	*Percent*	*Number*	*Inches*
Sweetgum	100	100	10	0.1	0.4
Blackjack oak ...	97	25	63	3.0	5.2
Hickory	87	30	0	0	0

[1]Basis: At least 10 trees per treatment unit; poison applied August 1946; examined July, 1947.

Sodium arsenite may be used in cups and on stumps if it is preferred, providing proper precautions are taken (*7*). In these experiments, approximately 1 tablespoonful of 61.5 percent sodium arsenite was used per cup. With this dosage, 82 trees 4 to 8 inches d.b.h. were poisoned per gallon of solution.

The 32.4 percent Ammate solution is about the right strength for spraying. The use of a non-soapy spreader will assist the spray in sticking to waxy leaves.

Costs

When Ammate is 18 cents per pound (in lots of 1,000 pounds or more the price is nearly one-third less), stumps of trees 2 to 4 inches d.b.h. can be treated for 0.6 cent per tree for poison (Table 3). Experience has shown, however, that it is easier to cup than to cut down blackjack oak trees 4 inches d.b.h. and over. The cost of chemical is 2.2 cents for a tree 8 to 10 inches d.b.h. which needs 4 cups. Chemical for poisoning 100 trees 1 to 8 inches in diameter will cost about $1.00 to $1.35 per acre. A fairly dense stand of sprouts from 1 to 3 feet high can be sprayed at a cost of about $15 per acre for material, still allowing 18 cents per pound for Ammate.

With labor at 60 cents per hour, a tree 4 to 10 inches d.b.h. can be cupped at ground level and poisoned at a labor cost of 0.8 to 1.6 cents, according to the size of the tree. An effective crew organization is for 2 men to prepare the trees and a third to apply the poison.

For trees up to 6 inches in diameter, applying a strong Ammate solution (32.4 percent) into a frill costs about the same for chemical and labor as injecting crystals into cups. Applying a strong solution into frills seems to be cheaper for larger trees.

The cost for materials may be slightly lower for sodium arsenite than for the Ammate at 18 cents per pound. The extra time required to mix and handle sodium arsenite, however, leaves little difference between the two in total cost of materials and labor.

Near Brewton, Alabama, a 10-acre stand of scrub oaks from 1.5 to 13 inches in diameter was cut down at an average cost of 0.5 cent per tree (*1*). On a similar area, trees were pulled up with a tractor for 5 cents a tree. On a third 10 acres, the trees were poisoned with Ammate crystals for 1.2 cents per tree. The main difference in cost between poisoning and cutting was the cost of the chemical. Sprouting was vigorous from trees to which no poison was applied.

Plans and Precautions

The detailed methods of application are as varied as the purposes for which hardwood control is undertaken. Whatever the purpose, the following orderly steps are suggested in planning and carrying out a control operation: (1) Determine the objective and the degree of control needed. (2) Make an inventory of the job—determine area and species to be killed, and estimate the number and size of trees and sprouts and their accessibility. (3) If possible, install test plots to check the effectiveness of the chemical, concentration, and method of application on the species in the area. (4) Balance cost of material and labor against the estimated value of control. Consider possible sale or girdling of large trees. (5) Secure poison and equipment and treat selected area. (6) Check results

TABLE 3.—COST OF APPLYING AMMATE CRYSTALS TO BLACKJACK OAK TREES OF VARIOUS SIZES IN CENTRAL LOUISIANA, 1946-1947[1]

Diameter at breast height (inches)	Applied in—	Cost per tree		
		Labor	Ammate	Total[2]
		Cents	*Cents*	*Cents*
1.0- 1.9	V-stump	0.5	0.3	0.8
2.0- 3.9	V-stump	.7	.6	1.3
4.0- 5.9	2 cups	.8	1.1	1.9
6.0- 7.9	3 cups	1.2	1.7	2.9
8.0- 9.9	4 cups	1.6	2.2	3.8
10.0-11.9	5 cups	2.0	2.8	4.8

[1]Basis: 214 trees for stump treatments and 340 trees for cup treatments.
[2]Includes walking time from tree to tree for 2-man crew. Labor cost 60 cents per hour and chemical 18 cents per pound.

3 months to 1 year later to see if follow-up treatment is needed.

Examinations of failures have revealed the following common departures from recommended methods: (1) improper preparation of the cup or frill; (2) applying too little chemical or allowing it to spill out of the cup or frill; (3) using too weak a solution; (4) waiting several hours before applying the chemical instead of applying it immediately to freshly cut wood. One forest owner found that some of his workers were missing some frilled trees with the poison. He added a few drops of a brilliant violet dye to each mix of solution and checking was easy thereafter.

Ammate has a temporary sterilizing effect on the soil. It is likely to kill any forage plants, weeds, or shrubs to which it is directly applied, but does not seem to be harmful to vegetation to which it is not directly applied, unless plants are connected by the root system. Trees and sprouts treated with it should be left standing for at least a year in order to get full effect of the poison. Sprouting may result if they are cut down too soon. In several instances, trees that seemed resistant at first died the second growing season. Ammate is not poisonous to livestock and is safe to handle, although users should avoid prolonged contact of it with the skin. However, it is very corrosive to metal. Spray equipment should be thoroughly cleaned with lime water after each use.

If sodium arsenite is used, extreme care is needed in handling, as it is poisonous to both humans and livestock. Every part of the body must be protected. The poison should be prepared out-of-doors. Avoid breathing the fumes that develop, wear a mask or cloth over the nose and mouth during the preparation, and avoid spattering the chemical on the skin or into the eyes.

2,4-D is not poisonous to livestock, but has a temporary sterilizing effect on the soil. Usually it is more effective as a spray on broadleaf plants and shrubs than on narrow leaf plants. It should not be allowed to remain on the skin for a long period of time.

Summary

Control of numerous scrubby hardwoods in the South is needed to improve timber-growing conditions and to allow better range grazing. One of the cheapest and most effective ways of getting rid of such trees is by poisoning them. Extensive tests on blackjack oak and other undesirable species in central Louisiana and elsewhere have shown sodium arsenite and ammonium sulfamate to be the two most effective chemicals in terms of amount of crown kill, prevention of sprouting, and cost.

Though different species and stand conditions require varying treatments, we can make definite recommendations for blackjack oak (*5*). When it is desirable to kill this species, use Ammate (80 percent ammonium sulfamate), in preference to the dangerous sodium arsenite. In spring, summer, or fall apply Ammate crystals in cups chopped 6 inches apart in the base of the tree. Use a tablespoonful of chemical per cup on freshly cut wood surfaces immediately after preparation. If the work is to be done during the winter, the cups may safely be raised to easy chopping height, 18 to 24 inches above the ground. A strong solution may be sprayed on stands of sprouts, but costs are high.

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Timber Cruising —The Time It Takes

C. B. Stott

Line plot timber cruising in the Central and Lake States has been expedited by the use of new techniques and tally forms. A cruising study involving 1,749 trees in 156 circular fifth-acre samples resulted in an average time of five minutes per plot for the time on plots only. Board foot volume differences between three methods of computing were less than two percent.

Forester, U.S.D.A., Forest Service, Milwaukee, Wisconsin. This study was completed with the cooperation of Mr. O. A. Alderman, State Forester, Ohio Division of Forestry, and the field assistance of the Ohio farm foresters. Mr. Wm. W. Barton contributed field time in Wisconsin and built the alignment chart.

TIMBER CRUISING is essential to the work of the practicing forester. The most common technique of the past forty years has been a four square, dot and dash field tally of sawlog trees in log and half-log lengths, and a computation of volume from separate board foot tables for each species.

A critical examination of past cruising methods was encouraged during the war years by the Timber Production War Project. Much thought was given to changing old techniques so that timber might be cruised faster. The forester of the war years was a busy man. He needed all of the short cuts and improvements that could be devised for he could not satisfactorily mark trees for cutting and sale, and give service in forest management without a reliable preliminary cruise of the timber.

Two improvements and time savers were described early in the war years. The first was a composite board foot volume table for all species in the Lake States.[1] The second, based on this composite table, was a cumulative volume tally sheet.[2] This tally sheet was not printed in the customary blank form, but with accumulative board foot volumes in each tally square.

Various forms of this cumulative tally sheet with its built-in volume table have now been in use for six years. During this period it has been found generally satisfactory for Central and Lake States species. It approximates a .78 form class and is reliable for the total timber stand on the mixed sites of the Central and Lake States. Correction factors for each species are available,[3] and should be applied when computing the board foot volume of stands or species showing considerable variation from the .78 form class of the standard table. Personal errors and statistical inaccuracies exceed minor discrepancies resulting from composite form of the table.

Testing the New Methods

Most timber estimating is done by a sampling process. In general more than half of the time needed to cruise the average timber tract is spent measuring or estimating trees within sample plots. Since this part of the job takes so much of the cruiser's time, and because other parts of the cruising job are variable, this trial of new methods was confined to the work done within sample plots only. Neither time nor volume figures have been expanded to the full area of the tracts cruised.

All of the cruising on 156 sample plots was done by one man, but different men tallied and timed the work on each of five tracts. Each tract was cruised twice, once recording trees by log length, and once by d.b.h., with usable heights on occasional random sample trees.

Each time the plots were covered, all trees nine inches d.b.h. and larger were measured with the diameter tape. Not one tree diameter was estimated. Use of the diameter tape, instead of the cruising stick, did not slow down the plot work, but measuring all of the trees took slightly more time than that needed for the ordinary cruising job, in which many diameters are estimated. The two methods of cruising were alternated by plots or by groups of plots to remove the advantage of familiarity with individual trees.

Use of a plot tape 52.7 feet long added to the accuracy and increased the speed of doing the work. Distances were checked to all trees near the circumference of the plot. The cruiser used progressive travel from tree to tree, did little or no backtracking, and save the maximum amount

[1] Lake States Forest Experiment Station, University Farm, St. Paul, Minn. U.S.D.A. Forest Service. Technical Note No. 203 "Composite board foot volume tables for the Lake States."

[2] Macon, John W., and S. R. Gevorkiantz. Estimating volume on the spot. Journal of Forestry 40:652-655, 1942.

[3] U.S.D.A., Forest Service, North Central Region. The Woodlot Forester's Tool Kit. March 1945, page 23.

of walking time consistent with securing an actual measurement of each tree.

The tracts cruised supported average stands of hardwood sawtimber. Three of them had previously been marked for cutting on a light single tree selection basis. Of the four woods located in Ohio and one in Wisconsin, three were ungrazed and two heavily grazed. The topography of the tracts varied from level to rolling. The commercial volumes in the stands ranged from 3,200 to 9,600 board feet per acre, International log scale.

Computations for the plots in each tract and for all of the plots in the five tracts combined were completed and timed by the cruiser. Computing time relationships were all based on the use of an automatic electric calculator for every step of the job practicable.

The Tally Sheets Used

A—Log Length Cumulative Volume Tally Sheet

This sheet (Figure 1), based on the original tally form designed by the Lake States Forest Experiment Station in 1942, is satisfactory for general cruising on large or small tracts, and it can be used for sample plots of any size by changing the sheet factor. The sheet requires the estimation of the sawlog height of the tree in 16 foot logs and 8 foot half-logs. When a single, fifth-acre plot is tallied, the sum of the last numbers crossed out in each block, or the sheet total, is the gross volume per acre in hundreds of board feet. To find the per acre volume when more than one plot is tallied on a single sheet, the sheet total is divided by the number of plots in the sample. The volume of any single tree tallied is twenty times the first number in each block.

The simplest way to find the gr ss volume on the sheet, without reducing to a per acre basis, is to multiply the sheet total by 20. To obtain net volumes directly with only one multiplication, subtract one from the multiplier "20" for every 5 percent of cull.

B—D.b.h. Localized Cumulative Volume Tally Sheet

This cumulative sawlog tally sheet (Figure 2) can be used for cruising small tracts, but it is best for large areas requiring 40 or more sample plots. The size of the plot may be varied, as in the case of the log length table. The trees are tallied by d.b.h. alone, but measurements of used height are required on eight or ten random sample trees for each species. The average diameters and the corresponding used heights of these sample trees are compared with the standard heights for the fair site which is the basis for the tally sheet, and a volume correction factor is applied. These factors, given on the back of the sheet, show the percent of volume variance per lineal foot for taller or shorter trees.

The method of use of this sheet is much the same as the first, or log length sheet. It is possible to simplify the computation of the net sheet totals and correct for usable length and species or form class variation by the application of a composite factor to the gross volume on the sheets. This factor is the product of the cull factor, and the species correction factor, and the volume correction factor obtained from the random sample tree measurements.

C—D.b.h. Localized Volume Tally Sheet—Not Cumulative

Those who prefer not to use cumulative tallies may be intrigued by this non-cumulative sheet (Figure 3) which is well suited to cruising large tracts. The method of computing the factors is the same as for the previous cumulative sheets. The left hand column does not give d.b.h. as customarily, but shows board foot volumes per tree for the corresponding d.b.h. classes given on the right side of the sheet. Height factors and usable heights for the sheet are also given in the right-hand columns.

This tally sheet was found to give the farmer, and forester as well, a much better working knowledge of the volume in individual trees than other sheets. It has been the practice in using the d.b.h. non-cumulative sheet to call the trees for tally, not by d.b.h. class, but directly by volume class. This procedure is not difficult because the volumes are given in intervals of 50 or 100 board feet.

Computing is a more convenient longhand job with this sheet than any of the others.

TABLE 1.—VOLUME VARIANCE FACTORS

Tree size	Standard used height fair site	Volume variance per lineal foot of used height above or below fair site
D.b.h.	*Feet*	*Percent*
12	15	4.3
14	20	3.8
16	24	3.5
18	27	3.2
20	29	3.0
22	30	2.8
24	31	2.7
26	32	2.6
28	32	2.5

FORM 102 R-9

INTERNATIONAL CUMULATIVE VOLUME TALLY SHEET

Based on Composite Volume Tables by the

Lake States Forest Experiment Station - 1945

NAME _____ **INTERNATIONAL**

COUNTY _____ DATE _____

STATE _____ ESTIMATOR _____

SECTION _____ TWP. _____ RANGE _____ FORTY _____

DBH	NUMBER OF 16 FOOT LOGS																VARIABLE TOP TO 6" D.I.B.												TOTAL BF. PER A.
	½			1				1½				2				2½			3			3½		4					
12	2	3	4	5	6	9	11	14	6	8	12	16	8	10	15	6	LEGEND & CULL %												PLOTS TALLIED
	6	8	9	17	20	23	26	29	20	24	28	32	20	25	30	12													
	10	12	14	31	34	37	40	43	36	40	44	48	35	40	45	17													CULL TREES
	15	16	18	46	49	51	54	57	52	56	60	64	50	55	60	23													
	20	21	22	60	63	66	68	71	68	72	76	80	65	70	75	29													
14	2	4	6	4	8	12	16	20	6	11	16	22	7	14	21	8													AV. DBH
	8	10	13	24	28	32	36	40	28	33	38	44	28	35	42	16													
	15	17	19	43	47	51	55	59	50	55	60	66	49	56	63	24	33	41	3										NEAR MERCHANTABLE TREES
	21	25	25	63	67	71	75	79	72	77	82	88	70	77	84	49	57	65	9	18									
	27	29	32	83	87	91	95	99	94	99	104	110	91	98	105	73	82	90	27	36									
	34	36	39	103	107	111	115	118	116	121	126	132	112	119	126	98	106	114	45	54									
16	3	6	9	5	10	16	21	26	7	15	22	29	9	18	27	11	21	32	12	25	37	½	4						
	12	15	18	32	37	42	47	52	37	44	51	59	36	45	54	43	53	64	49	62	74	14	15						
	21	24	27	58	63	68	74	79	66	74	81	88	63	72	81	75	85	96	86	99	111	28	31						
	30	32	35	84	89	94	100	105	96	103	110	118	90	99	108	106	117	128	124	136	148	42	46						
	38	41	44	110	116	121	126	131	125	132	140	147	117	126	136	138	149	160	161	173	185	56	62						
18	4	7	11	7	14	20	27	34	9	19	28	38	12	24	35	14	28	42	16	32	48	18	20						
	15	18	22	40	47	54	61	68	47	56	66	75	47	59	70	56	70	83	64	80	96	36	40						
	26	30	33	74	81	88	94	101	85	94	103	113	82	94	106	97	111	125	112	128	144	54	60						
	37	41	44	108	115	122	129	135	122	132	141	150	118	129	141	139	153	167	160	176	192	72	80						
20	5	9	14	8	17	26	34	42	12	24	35	47	15	30	44	18	35	52	20	40	60	22	25						
	18	23	28	51	60	68	76	85	59	71	83	94	59	74	88	70	88	106	80	100	121	45	50						
	32	37	41	94	102	110	119	128	106	118	130	142	103	118	133	122	140	158	141	161	181	68	75						
	46	51	55	136	144	153	162	170	153	165	177	189	148	162	177	175	192	210	201	221	241	90	100						
22	6	11	17	10	21	31	42	52	14	29	44	58	18	36	54	22	43	64	26	49	74	28	31						
	22	28	34	63	73	84	94	104	72	87	102	116	72	90	109	86	108	129	99	124	148	56	61						
24	7	13	20	13	25	38	50	63	17	36	52	69	22	43	65	26	51	77	30	59	89	33	37						
	27	33	40	76	88	101	113	126	86	104	121	138	86	108	129	102	128	154	119	148	178	66	74						
26	8	16	24	15	30	45	60	75	20	41	61	82	25	51	76	30	60	91	36	70	106	39	44						
	32	40	47	90	106	120	135	150	102	123	143	164	102	127	152	121	151	181	140	174	209	79	88						
28	9	19	28	17	35	52	70	87	24	48	72	96	30	60	90	35	70	106	41	81	122	46	51						
	37	47	56	104	122	139	157	174	120	143	167	191	119	149	179	141	176	212	162	203	244	92	102						
30	11	22	33	20	41	61	82	102	28	56	85	110	34	69	103	41	81	122	47	93	140	53	59						
32	13	26	38	24	47	71	94	118	32	64	96	129	40	79	119	47	94	140	54	108	162	61	68						
34	15	29	44	27	53	80	107	134	36	73	110	146	46	90	136	53	106	159	61	122	183	69	77						
36	16	33	50	30	60	90	120	150	41	82	123	164	51	101	152	60	120	179	69	138	206	78	87						
38	19	37	56	34	67	101	135	168	46	91	137	183	56	113	170	67	134	200	77	154	231	87	97						
40	21	42	62	37	74	112	149	186	50	101	151	201	62	125	187	74	148	221	85	170	255	96	106						
42	23	46	69	41	82	123	163	204	55	110	165	220	68	136	204	80	161	242	93	187	280	106	118						

VOLUME IN HUNDREDS OF BOARD FEET - INTERNATIONAL

(A) MULTIPLY the SUM of last figures used in each block by 100.0000(1) For VOLUME PER ACRE divide this product by the NUMBER of 1/5 acre plots.--(2) For MARKING TALLY VOLUME divide the product (from A) by 5.

Fig. 1.—Log length cumulative volume tally sheet.

FORM 64 R-9
1-1-48

INTERNATIONAL
LOCALIZED CUMULATIVE VOLUME TALLY SHEET

FOR COMMERCIAL HARDWOOD STANDS
Based on Composite Volume Tables by the
Lake States Forest Experiment Station -- 1941

NAME _____ INTERNATIONAL

COUNTY _____ STATE _____ PLOT _____

PARTY _____ DATE _____ TYPE _____

_____, S _____, T _____, R _____, _____ MER. STRIP _____

dbh	INTERNATIONAL LOG RULE — FAIR SITE (VARIABLE TOP TO MINIMUM 8" dib)																			
12	3	5	8	11	13	16	19	21	24	26	29	32	34	37	40	42	45	48	50	53
	56	58	61	64	66	69	72	74	77	80	82	85	87	90	93	95	98	101	103	106
	109	111	114	117	119	122	125	127	130	132	135	138	140	143	146	148	151	154	156	159
	162	164	167	170	172	175	178	180	183	186	188	191	193	196	199	201	204	207	209	212
14	5	10	14	19	24	28	33	38	43	48	52	57	62	66	71	76	81	86	90	95
	100	104	109	114	119	124	128	133	138	142	147	152	157	162	166	171	176	180	185	190
	195	200	204	209	214	218	223	228	233	238	242	247	252	256	261	266	271	276	280	285
	290	294	299	304	309	314	318	323	328	332	337	342	347	352	356	361	366	370	375	380
16	7	14	22	29	36	44	51	58	65	72	80	87	94	102	109	116	123	130	138	145
	152	160	167	174	181	188	196	203	210	218	225	232	239	246	254	261	268	276	283	290
	297	304	312	319	326	334	341	348	355	362	370	377	384	392	399	406	413	420	428	435
18	10	20	30	41	51	61	71	81	91	102	112	122	132	142	152	162	173	183	193	203
	213	223	233	244	254	264	274	284	294	304	315	325	335	345	355	365	376	386	396	406
20	13	27	40	54	67	80	94	107	121	134	147	161	174	188	201	214	228	241	255	268
	281	295	308	322	335	348	362	375	389	402	415	429	442	456	469	482	496	509	523	536
22	17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340
	357	374	391	408	425	442	459	476	493	510	527	544	561	578	595	612	629	646	663	680
24	21	42	63	84	105	126	147	168	189	210	231	252	273	294	315	336	357	378	399	420
26	25	50	76	101	126	152	177	202	227	252	278	303	328	354	379					
28	30	60	89	119	149	179	209	238	268	298	328	358	387	417	447					
30	35	69	104	138	173	208	242	277	311	346										
32	40	79	119	158	198	237	277	316	356	395										
34	45	89	134	179	224															
36	50	100	150	200	250															
38	55	110	165	221	276															
40	60	121	181	241	302															
42	65	131	196	262	327															
44	71	141	50	86	171															
46	76	152	52	90	181															
48	81	162	54	95	190															

NEAR MERCHANTABLE TREES

LEGEND

NO. PLOTS TALLIED

GROWTH RATE (R) — RINGS PER RADIAL INCH — AVG. — TOT.

SAMPLE USABLE HEIGHTS in Feet

dbh in inches	12	14	16	18	20	22	24	26

SHEET TOTALS

(poor stock)

(good stock)

(good stock when 2 inches larger in dbh)

SPECIES

FIGURES APPROXIMATE VOLUME IN HUNDREDS OF BOARD FEET PER ACRE per 1/5 acre plot tallied -- INTERNATIONAL 1/4" Log Rule

Sum of final figures marked represents 1/20 actual volume tallied. For per acre volume, multiply by 100 and divide by number of 1/5 acre plots.

FIG. 2.—D.B.H. localized cumulative volume tally sheet.

INTERNATIONAL LOCALIZED VOLUME TALLY SHEET FOR COMMERCIAL SAWLOG STANDS

BOARD FEET	SPECIES					FAIR SITE		
						D.B.H. IN INCHES	HT. FACTOR %	USED HT. IN FEET
50						12	4.3	15
100						14	3.8	20
150						16	3.5	24
200						18	3.2	27
250						20	3.0	29
350						22	2.8	30
400						24	2.7	31
500						26	2.6	32
600						28	2.5	32
700						30	2.5	32
800						32	2.4	32
900						34	2.4	32
1000						36	2.3	32
1100						38	2.3	32
1200						40	2.2	32

COMPOSITE FACTOR = PRODUCT OF CULL, USED HEIGHT, AND SPECIES FACTORS,
OR
(1.00 − CULL %) X 1.00 ± HEIGHT FACTOR X 1.00 ± SPECIES FACTOR.

						CULL TREES	
GROSS VOL.						SPECIES	NO.
COMP. FACTOR							
CORRECTED VOL.							
NO. TREES							
CULL FACTOR							
SPECIES FACTOR							

	MEASURED USED HEIGHT										NEAR MERCH. TREES	
TREE NO	D.B.H	U.H.	D.B.H.	U.H.	D.B.H.	U.H.	D.B.H.	U.H.	D.B.H.	U.H.	SPECIES	NO.
1												
2												
3												
4												
5												
6												
7												
8												
HT. FACTOR												

FIG. 3.—Localized volume tally sheet (not cumulative).

TABLE 2.—CRUISING AND COMPUTING TIME ON 156 FIFTH-ACRE CIRCULAR PLOTS (1749 Trees)

Method and tally sheet	Trees per plot	Bd. ft. per plot	Time per plot: Cruising time	Time per plot: Computing time	Time per plot: Total time
A—Log length cumulative	11.2	1224	4′-36″	0′-20″	4′-56″
B—Dbh, Localized cumulative	11.2	1210	4′-14″	0′-34″	4′-48″
C—Dbh, Localized, not cumulative	11.2	1204	4′-14″	0′-30″	4′-44″

The board foot volume per acre is found by dividing the sheet total volume by the acres in the sample. This sheet can also be used with sample plots of any size.

Results of the Trial of Three New Volume Tally Sheets

Time Requirements by Methods of Cruising

The time it takes to cruise timber gives a good measure of the time needed for the spade work part of the forester's job, and the job is not as big as many foresters think. Experienced men require a surprisingly small amount of time per sample plot for all three of the given methods of cruising. This applies to all of the five combined tracts averaging 56 commercial and cull trees 10 inches and larger per acre, or 6060 board feet.

It took only 24 minutes of the cruiser's time per acre of sample, or slightly less than 5 minutes per fifth-acre circular plot to make diameter tape measurements on all of the trees on the 31.2 acres sampled. Computing time added only 2½ minutes per acre of sample to the job time. Table 2.

If half of the forester's cruising day is spent measuring plot samples, spaced 2 chains apart, and he has the assistance of a tally man, these time records show that he can complete roughly 50 plots on the average commercial farm woodlot. This is at the rate of 4 minutes for every thousand board feet International net log scale of commercial sawlog timber, and means that up to 60,000 board feet of salable timber can be estimated on plots by a two-man crew in one day. Somewhat more than half of this amount can be completed when the cruiser works alone and uses the new cumulative tally sheet.

To measure and record cull trees and those in the ten-inch d.b.h. class took more than one minute of the plot time. A saving in time would result if these trees had not been recorded, but to truly appraise the wood-producing power of the forest they are important in the record.

All classes of trees on plots were measured at an average rate of 25 seconds each. Prorated against only the commercial trees, the time increases to a little more than one-half minute per commercial sawlog tree.

Experienced cruisers will find that between the three methods there is little difference in the time per plot, per tree, or per thousand board feet. Log length cruising seemed, plot by plot, to take more time than the other methods. This is shown by the total time records. Tables 3 and 4.

Time Requirements by Tracts

Rough terrain, heavy undergrowth, windfalls, and to a lesser extent the number of trees per acre are four of the major interlocking factors influencing cruising time. All of these variable conditions were found on parts of the areas covered and all influenced the time requirements.

TABLE 3.—CRUISING AND COMPUTING TIME PER TREE

Method of tally sheet	Seconds per tree Commercial trees 11″+: Cruising	Seconds per tree Commercial trees 11″+: Computing	Seconds per tree Commercial trees 11″+: Total
A—Log length cumulative	34.8	2.5	37.3
B—Dbh, localized cumulative	32.0	4.3	36.3
C—Dbh, localized, not cumulative	32.0	3.8	35.8

TABLE 4.—TIME PER MBM, NET INTERNATIONAL LOG SCALE

Commercial trees only

Method and tally sheet	Time per thousand feet, B.M.: Cruising time	Time per thousand feet, B.M.: Computing time	Time per thousand feet, B.M.: Total
A—Log length cumulative	3′-45″	0′-16″	4′-01″
B—Dbh, localized cumulative	3′-29″	0′-28″	3′-57″
C—Dbh, localized, not cumulative	3′-30″	0′-25″	3′-55″

It is difficult to build up experience tables of cruising time without doing experimental work under many more forest conditions than this study encountered. Nevertheless, such a table is given; and, with some exceptions, it gives mild trends. Table 5.

TABLE 5.—EXPERIENCE TABLE OF CRUISING TIME BY CHARACTER OF TRACT

Character of tract	No. of trees per average plot	Cruising time per 1/5 acre plot	Cruising time per tree
Very easy	8.3	2′58″	21″
Quite easy	10.6	4′01″	26″
Easy	10.1	4′42″	24″
Not easy	14.2	4′39″	21″
Difficult	10.1	5′01″	28″

The time to estimate the timber on open, overgrazed tracts was about half of that required to do a corresponding job on dense, brushy, ungrazed tracts. Where there were few trees the total cruising time was roughly two-thirds of that required where there were many trees. The time per tree is 21 seconds in both of these extremes, due to other compensating factors.

This experience table bears out what many a forester who handles his job from the ground up has discovered. A cruising job is primarily difficult and time-consuming, because of the severity of the physical features of the landscape and the heavy debris and young growth present. Number of trees is a secondary factor. Almost any cruiser on any hardwood timber tract will find that his time per tree, on plots only, varies between 20 and 30 seconds.

Volume Comparisons

The summary tabulation of volumes per acre, for all species combined for the three methods, shows a variation of only one to two percent. The greatest single difference is five percent in the case of basswood. Minor species show no radical inconsistencies. Differences are due, in part, to rounding off answers, a process that was not carried out to the same degree for all computing methods.

The non-cumulative, localized volumes are consistently lower than those of the other tables. This is caused in part by rounding off the board feet per tree in the volume table to the nearest 50 and 100 board foot intervals, Table 6.

Summary and Conclusions

Timber cruising, an essential part of the practicing forester's work, is a time-consuming task. New tally sheets with built-in volume tables, widely used in the Central and Lake States are now reducing the needed time. Experimental cruising, using these new sheets, on five different tracts of commercial timber, shows that the job does not require as much time as many foresters think.

One-fifth acre plots totalling 156 in number were estimated in 4½ minutes each, considering the time spent on plot only. This is at the rate of 27 seconds per tree. Computing time added another half minute per fifth-acre plot, or a few seconds per tree, to the time needed to complete the estimate and summarize it.

Time variation by tracts is caused, in the main, by rough topography, heavy young growth and debris, but it is influenced somewhat by the number of trees per unit area. These, and many other interlocking variables, resulted in cruising and computing time differences of from 3 to 6 minutes per plot in five different tracts.

Volume, as well as time variations in the use of the three methods are small. It seems quite apparent that any of these new tally sheets will give comparable results in less time than past methods used in Central and Lake States.

TABLE 6.—INTERNATIONAL LOG SCALE VOLUME COMPARISON PER AVERAGE ACRE

Method and tally sheet	Red oak	Sugar maple	White oak	Am. beech	Black oak	Red maple	Bass-wood	Am. elm	Others	Total
					Net board feet per acre					
A—Log length cumulative	1769	1103	726	511	452	301	249	249	[illegible]	6118
B—Dbh, localized cumulative	1748	1065	729	502	452	302	226	248	776	6048
C—Dbh, localized, not cumulative	1744	1055	728	497	450	299	237	248	773	6022

What Attracts the Forest Consultant?

James D. Pond

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THE neophyte consultant may choose his line of work from a wide range of activities. The JOURNAL OF FORESTRY (*1*) lists 21 categories of consulting work, besides many side-lines which increase his opportunities to make a living. Some fields are interdependent. A satisfactory management plan requires surveys, maps, estimates of volumes and quality, growth studies, and listing of markets, to say nothing of provisions for protection, soil conservation and wildlife care.

The writer has been a part-time consultant for the past 11 years, and full-time consultant for over 5 years. He admits of much to learn, and of unfamiliarity with some fields. Timber estimates, appraisals, and sales together with management plans have held his interest. For a time he handled some tree-service.

In the early days when Pinchot, Fernow, Fisher, Price, Graves, Hosmer, and many others built the foundation of our profession, most were consultants on the side. They took on all kinds of work, mostly in developing management plans for some of the larger timber tracts. Some of these plans were printed as bulletins of the old Bureau of Forestry. But now the consultant can aspire to any one of 21 or more fields of specialization.

Arboriculture

Some folks contend that arboriculture is not real forestry, but at least it deals with trees. Where does the consultant fit into arboriculture? He may develop from a one-man tree-expert to running a full-time business. The beginner may start with about 21 dollars invested in a rope, pruning-saw, axe, and can of paint, working by himself or with the help of casual labor. As he gains experience, reputation, and much-needed capital, he expands and may soon have several thousand dollars invested.

Equipment may well include two or more trucks, one with heavy duty winch; several miles of assorted ropes; saws in all possible shapes and sizes; pole-clippers and pole-saws of varied lengths; canvas, bosun's and leather saddles; and a weird collection of other tools such as hand-pruners, crow-bars, hammers, chisels, bits, and augers by the dozen, pliers, wrenches, all kinds of axes, and ladders collapsible and extension. In other words, all of the equipment needed to service a tree from root to twig.

He may swing into tree-moving, with a heavy investment in ponderous cranes and low-slung prime movers. He may add a line of sprayers, handling insect and disease problems not only for private owners but also for parks, towns, and highway systems. This, however, is strictly seasonal work.

Some consultants act as agents for large concerns on a commission basis. Bartlett and Davey companies employ their own foresters, who have developed fine techniques for saving trees. Some tree experts contract with utility companies to keep telephone and electric lines clear of branches. These same operators may go a step farther and clear rights-of-way for new power or cable lines and to cut brush under high-tension lines. One consultant in New York State has even contracted to set poles for new rural electrification projects.

Experience and training are necessary. There are few books on tree surgery, only a few state and federal bulletins. There will be many headaches, including lack of trained and dependable climbers; competition from fly-by-night operators; and the wonderful series of complaints from clients.

Economic Studies of Forest Operations

This broad title may cover simple bookkeeping on a logging job, or extend to intricate cost accounting with time studies. Results of some cost studies have been published by the Forest Service and by trade associations, covering logging and milling expenses, costs of utilization of trees of different sizes.

One lumberman in New York State has hired a consultant to check on costs of stand improvement work, starting with four different plots of five acres each. If this low-grade material can be produced at a cost to compete with that of bituminous coal, used to supply steam for power and for dry-kilns, then some 7,000 acres will eventually benefit from thinnings and cultural work. Similar opportunities await the consultant who can analyze operations for owners, loggers, and mill men.

Analysis of the different parts of a job will often point to the need for mechanization, to elimination of waste motions or to re-arrangement of workers, machine, and operations for greater efficiency. For instance, thinning opera-

tions on the Luther Forest (*2*) have evolved, partly from trial-and-error methods, partly from studies and analyses of operations, and in part through job break-down and classification. Even a little thing like using a hooked rod to draw a chain under a pile of poles increases the efficiency and saves the energy of the choker-setter. Such studies have raised production on the Luther forests to more than a standard cord of poles per man per day, from stump to freight car.

Knowledge of labor costs, of operating expense including depreciation rates, of the various kinds of forest taxes, insurance, machinery operation and maintenance, and their application to different logging, milling, and development jobs, must be acquired by the consultant handling economic studies. A keen mind and an inquiring eye, with a background of accounting, are essential in this field.

Forest Management and Silvicultural Studies

This title covers a multitude of services including protection, timber estimates, growth studies, and logging methods as well as cutting practices and management plans.

The preparation of detailed and voluminous management plans has long occupied the attention of foresters. Pretty maps, intricate diagrams and charts, long columns of figures, well planned programs for development, logging and marketing are included in the many management plans gathering dust, and often never placed in operation. Why? Because the forester usually failed to combine good forestry and economics, and to provide for some form of service to put the plan into practice.

The writer is convinced that the first work on unmanaged tracts is to remove the overmature and cull trees in order to place the stand in prime condition for future management. This first process requires only an extensive management plan until the stand is in condition to grow timber in maximum quantity of highest quality. To achieve this purpose, and depending upon the stand, minimum diameter limits may be set as in a pulpwood region, or the trees may be marked for cutting.

The prime test of a silviculturist is how he marks a stand of timber. He must keep in mind that minimum amounts of logs and other products must still be high enough to cover logging costs, to attract a contractor when he enters the picture. The consultant must be a tight-rope walker, balancing the needs of the forest against the demands of the owner for revenue, of the cutters or of the contractor to have a good-sized cut. Marking the trees with a hand spray-gun is the speediest method, leaving a distinctive mark on the stump to check on the cutting, a mark that will last at least five years. Distinctive marks can be used to distinguish between sawlog, pole, pulpwood, fuelwood cuttings; to mark cull trees; to mark a boundary line, or the limits of reserved strips. Marking with paint is not a perfect system as one lumberman found out when he caught a logger trying to transfer congealed paint from a bark crevice to a well-formed, unmarked tree nearby.

This principle of selection is an excellent selling point to estate owners who fear that their stands will be stripped, and who often think more about aesthetics than about revenue or good forestry. A protection strip can be marked out along roads, around lakes and camps, so that special areas are reserved from cutting.

One one estate in western New York, where, until the war, no live trees had been cut for three or four generations on some 2000 acres of timberlands, the author's company has marked over four million feet of standing timber for harvesting, leaving about 2½ million feet for future growth on the same areas. Stumpage has been sold on bids to nearby mill men who did the cutting. They were a bit shy of the marked-tree method at first, but now appear to like it. A flexible minimum d.h.b. of 20 inches was followed in marking white, red, swamp white, and black oaks, hemlock, basswood, and white ash, with all maple and hickory taken to a 16-inch minimum. By "flexible" is meant leaving all thrifty stems below the minimum, but poorly formed, decayed and crowded stems were also marked down to 10 inches d.h.b. Now the owner refuses to sell more stumpage until some method or outlet is developed for utilizing the tops and cull trees. Since he is an ardent horseman and rides to hounds, he wants to have woodlots cleaned up. So the consultant has another problem to solve.

Service

The great need in bringing about good forest management is for consultants and others with experience, equipment, and capital to carry out in actual practice the details of the well-prepared plans. Many forest owners—aging, nonresident, or without the nerve, experience, and desire to undertake woods operaions—will not follow or utilize a management plan. The timber

deteriorates, or is sacrificed to some plausible, high pressure buyer. One way out is through hiring a contractor with good finances, the right equipment, and a crew of experienced woodsmen, who will harvest the timber, logs, pulpwood, even novelty stock such as white birch, ash for handles, and other products. Such contractors are fairly common in the more heavily timbered sections of the country, but are hard to find in agricultural areas. Most contractors want a cut of at least a half-million feet; if camps are to be built, then three to four million feet, or five or six thousand cords of pulpwood. For the enterprising consultant here is a field that has hardly been touched amongst the small woodlots.

On these small tracts the Jackson timber harvester and other portable rigs will serve the needs of farmers and other owners who will utilize part or all of the timber on the site. The consultant who offers logging and milling service to supplement his technical advice should have plenty of work ahead. One consultant in southern New York, several in Virginia, one in Tennessee, are known to supply this type of service. In Oregon, a group of three foresters is following up the big loggers, and salvages smaller trees, top logs, and cull material left after the heavy cut.

Forest Protection

Control of forest diseases and insects has usually been left to state and federal agencies. However, on large tracts of privately owned timber, silvicultural practices and salvage operations have been followed under the direction of consultants to halt the spread of and to recover losses from such agents. The consultant may make surveys to determine extent and amount of damage and to recommend methods of control; then may supervise the cutting to control pests and disease. He might offer a special spray service, with dusts and insecticides spread by airplane or helicopter.

The arboriculturist must face the call to protect trees and shrubs against a horde of insects and wide range of fungi. This may be only a tree-to-tree or group service, or may take in whole towns, parkways, and streets.

Forest fire protection and prevention, a prime responsibility of public agencies, is still within the realm of the consultant. Surveys to locate towers, fire roads, tool depots, and other facilities, the location of waterholes and pools from damming streams, may be necessary. For the small owner, planning reforestation programs with fire lanes and plowed strips along roads must be considered. Slash disposal and reduction of fire hazard must be included in logging plans. The consultant should cover in any timber sale contract provisions for fire prevention and protection, insisting on the maintenance of backpack pumps, shovels, rakes, and other tools to be reserved solely for fighting fires. Penalties for starting forest and other fires should also be included in the contract.

Game and Wildlife Management

Correlated with silviculture in the management plans should be provisions for maintenance and development of populations of fish and game. For the consultant this may involve the location of and final distribution of supplies of fish, pheasants, grouse, squirrels, rabbits, deer, fur-bearers, and other denizens of the forest. Silvicultural plans may be varied to include clear-cutting of small areas for browse; saving of culls and snags as den trees; retention of yellow birch and ironwood for their buds for grouse; planting of spruce, hemlock, and pine for shelter; seeding of open areas with grains and grasses for food and forage; trapping or killing of predators; even the removal of carp and other species deleterious to game fish. One ranger school graduate undertook a five-year game improvement program on a 5,000 acre estate, with the understanding that the owner, who was *not* from Missouri, had to be shown a considerable increase within that period.

Control of damage to the forest by game may be another problem for the forester. Rabbits and mice may girdle trees in plantations; porcupines will chew off twigs; deer browsing may ruin hardwood reproduction, also red pine and other plantations. Flooding by beaver, or undermining of earthen dams and levees by muskrats, may require trapping and transplanting of all or part of the rodent population. On one of the Averill Harriman tracts near Tuxedo Park, N.Y., beaver, unknown in that section for past 100 years, flooded and killed the timber on more than 160 acres in about 6 years.

Camps, recreation areas, even sportsmen's associations and clubs may call on the consultant for help. Stream-improvement may be needed to increase the fishing; feeding programs to maintain the supply of stocked fish. The presence of wildlife, even beaver in a small pond, may add to the appeal and attractiveness of a private camp or hunting lodge.

Logging Engineering

In the West consultants find a wide field of activity in laying out roads, planning yard and loading facilities, in mapping out logging areas or circles. In the East there is less demand for this type of service, although one consultant claims there should be more of this type of service since he states that little improvement, except the tractor, has been made in Adirondack logging since the introduction of the saw.

However, consultants will be called upon to work with owners and contractors in fulfillment of their duties connected with the application of management plans and in marketing forest products. They will need to locate roads, bridges, skidways, dams, and even mill sites, to prevent damage to remaining timber and to reproduction; to protect scenic sites, fishing areas, and game reservations. The consultant can often effectively aid the contractor in solving logging problems. One area in western New York stumped a succession of loggers, since the steep side hill above a deep gully was too much for horse or tractor, and often whole trees slid down the slope. An adaptation of the method described by Koroleff and Silversides (*4*) for transporting logs by gravity on a suspended wire is now being tried with good promise.

A knowledge of surveying, and a background in road, trail and bridge location, and construction, are essential for the logging consultant. He must know drainage; stress and strain characteristics of timbers, cables and rods; the permeability and compaction of different soils. He must be familiar with the costs of operating all kinds of logging machinery, and the types which are suitable for the job at hand. He must know where to use winch-and-cable, tractors, or horses; what degree of damage will be caused by various methods such as low-lead, high-lead, or tractor skidding. He must recognize the influence that various methods will have on destroying or encouraging the development of reproduction. He must be able to adapt his operating system not only to the topography and distribution of the timber, but also to the silvicultural needs of the forest.

Marketing Studies and Trade Promotion

The consultant who studies markets and keeps his finger on the pulse of trade has a wide field. He has to be a good salesman with plenty of Yankee ingenuity and resourcefulness. He may work with established industry to move the usual line of products; or he may seek other and new outlets, developing additional markets for old or for new products. He may find there is more profit in some pre-manufacture, instead of selling rough products.

The marketing consultant might find, for instance, that ash logs bringing $72.50 per M, Doyle scale, F.O.B. mill, will return more to the owner if the logs are made into 40-inch splits at 25 cents each, loaded on cars. (It has been stated that a 12-inch ash tree will produce about 15 splits, as compared to perhaps 30 to 40 board feet in logs.) Low-grade hardwoods may bring more for feltwood than when buzzed up and delivered as fuelwood.

Markets must often be developed for products for which there is no local demand. Luther (*2*) has shown that small thinning in red pine plantations can be harvested efficiently and shipped nearly 100 miles as cooperage stock as a profitable business, or he would not continue such a venture. His previous market had been a brickyard 10 miles distant where his thinnings sold at a small profit.

One consultant working on a two-year contract has developed outlets for sawlogs and pulpwood from some 2,000 acres on a client's estate. He has engaged a contractor who cuts marked trees, then sorts logs and bolts by size and quality for the particular market. The average sale price of this material is slightly lower than a normal run of logs or pulpwood would bring, but the owner under the guidance of the consultant will net more in the end thru salvage of low-grade material, of which there is a large amount, and will at the same time be practicing some real forestry.

The consultant often must go beyond the mere location of a market. He must be prepared to hire contractors or cutters; to arrange for trucking; to mark and scale the trees and products; to arrange for financing; to check on compensation and public liability insurance; to make out contracts and bills of sale; and even to arrange for releases on mortgages. Some business training, knowledge of contracts and business law, and ability to deal with a wide range of buyers must be included in the consultant's training.

The consultant may well act as the part-time manager of a woodlot or mill cooperative. Marking trees, scaling logs, and the development of markets for rough, semi-finished or manufactured products of the cooperative association will provide income and fill in days when the consultant is not busy on other projects. The author helped develop, while in extension work,

a cooperative crate mill which utilized plantation thinnings, also popple, basswood, and elm for produce containers. This coop mill failed principally because of the lack of a good manager, for wood resources were plentiful, labor available, and a wide market existed for crates.

Some consultants act as buyers for various lumber and wood-using industries, purchasing stumpage or logs at the side of the road. This field has possibilities but may restrict opportunities in other fields. The author's company, which serves either industry or the private owner, turned down an attractive offer to buy stumpage, preferring to handle individual sales on commission to the highest bidder. Our independence is a valuable asset. However, opportunities may arise for handling specialty products such as ash for handles and baseball bats; black walnut for veneer; Christmas trees; and greenhouse supplies and novelties.

Selling timber for clients, either on commission, contract, or retainer basis, preserves the consultant's independence. He can estimate and appraise the timber for a fee, thereby performing a special service, then handle the sale on a separate basis. In our experience, it has not been profitable to undertake the whole job of estimating, appraising, selling, and checking the timber sale for a commission payable when timber is cut and as paid for. Good timber sells easily, but poor timber is hard to move. And often the consultant is the last resource in moving some low-grade timber. The wise consultant puts a higher fee or commission on such sales. Another problem is that many timber buyers are used to dealing with the unwary seller, and refuse to look at or to make a reasonable offer on a tract where volume and value have been established.

In one North Atlantic state it is reported that one consultant charges 20 percent of sale price for handling sales and for checking and supervising the cut. Other consultants charge 5 to 10 percent commission for handling the sale, plus costs of scaling and supervision. In New Jersey where state foresters perform the marking service, consultants get 10 percent for making the sale to the highest bidder, and for checking the scale, cutting, and brush disposal.

Professional Ethics

The consultant often has only his conscience to guide him in deciding how much to charge; how to handle a sale; and who shall pay his commission. It is distinctly unethical to charge commissions to both buyer and seller. If the consultant is buying for some company, he should not approach a seller without notifying him of such connection or employment. The promotion of a job on the basis of special contacts, which may be only in the consultant's mind, should also be avoided. The author is in the process of selling timber on two large tracts; the owners have a policy of not paying sales commissions; thus any buyers are informed that their bids must include an additional sum to cover commissions.

When more than one consultant is chasing a prospective job, certain ethics must be followed. Both can make bids, and leave it to the client to make his choice. If one consultant makes a bid, and another is asked to consider the same job with the same amount of work, it should be distinctly out-of-order for the second man to underbid the first. One well-known forester resigned from the Society recently as an aftermath of such underbidding. There is another case in which two foresters were separately asked to contract a damage survey; one, just out of college, bid $100, the other with more experience, bid $250 and got the job.

The good old principle of doing to others what one would choose to have done to him pays good dividends in the long run, not only in reputation, but in better sleep.

Pulpwood Operations

In some sections, including New York and New England, the pulp and paper companies buy their supplies of wood principally thru jobbers, who are paid about $1 per cord over the regular market. This payment was allowed even during the days of the unlamented O.P.A. Consultants can invade this field, but must expect to handle many details such as financing the cut, arranging for trucks, procuring labor, and arguing over the scale.

Most pulp and paper companies now have their own foresters, but often call in consultants to make cruises on tracts they are buying or swapping with other companies, and to assist on special projects. Independent estimates may be needed where large areas are to be flooded in river-control and reservoir projects.

The growing demand for hardwood pulpwood is attracting the attention of many timber owners who do not have the experience for getting out this crop. Consultants with knowledge of special techniques in barking, skidding, and loading; in use of wood-mills for bucking, of

de-barkers and mechanical loaders will have many opportunities in this field.

Surveying and Mapping

Any consultant worth his salt should be able to "shoot a gun" or run a transit, and to prepare a readable, accurate map. Surveys are usually necessary in connection with timber estimates; may be required for other purposes. One leading potato grower in western New York bought nearly 20 farms and operated for several years without knowing where many of his lines were located; finally built a farm pond only to discover after spending some $1,500 that a good part of the pond, including the dam, was on property he did not own. As a casual outgrowth of a preliminary survey for a reforestation program, the whole farm, or over 2,200 acres, was surveyed by a consultant.

This consultant is not a licensed surveyor or engineer, and so informed his client. However, the client had the job done with that understanding. To specialize in surveying the consultant must consider a number of problems.

In many states a license is required; in others, just the possession of a transit. This license is hard to get; for instance in New York State, requirements were just increased from 10 to 12 years for practical experience, working with a licensed engineer, before one could even take the examination, which is notably tough.

However, the usual amount of surveying required as part of a timber cruise is not so great, entailing the re-running of some old lines along broken-down fences or old blazes. On timber trespass and damage suits, perimeters of cut and injured areas must be mapped; on other jobs new routes for logging roads must be located, or rights-of-way marked out. Most foresters fail to see the advisability of sinking $300 to $400 in a transit, and prefer to rent one, where available, at a dollar or two a day.

Timber Valuation, Appraisal and Estimates

These interdependent fields are lumped together. Unless a cruiser is an old-time "timber looker," he has to make a pretty good estimate before figuring the value of a timber tract. The going price for a certain species, even for several species together, in a particular locality may be $10 per M for stumpage, but unless the forester determines volume, quality, logging chances, defect percentages, merchantable lengths, range in sizes, distance to market, he can miss his appraisal by a long ways.

The consultant attracted by the field of timber estimating may be getting in over his depth. It is not every forester who will make a good cruiser. The equipment required is not large nor expensive, but the amount of judgment, good sense, and practical experience for a good cruiser is almost unlimited. We had a forester with an M.F. with us for a short time—he could not even read a Biltmore stick correctly, nor map types, nor remember tree species. A recently graduated M.F. hired by a lumber company to cruise and handle their timberlands lasted less than six months—he could not do the necessary field work. Both of these men found a lack of experience was their most glaring fault.

The beginner in consulting work needs more than the simple tools of his trade. He must know timber types; variations in species on different sites; merchantable minima in d.b.h. or stumps and in tops; maximum number and sizes of knots allowable; and—one of the most important—how to judge defect. He must realize that defects allowable in some species for particular uses cannot be included for other kinds and degrees of utilization. One large consulting company, some 30 years ago, neglected the defect factor in virgin hardwoods; instead of a 20-year cut, their employer was not amused to find only a 7-year supply. A pair of consultants who have depended largely on aerial photos with a minimum of ground work, found they were about 40 percent too high in their estimates, principally because they forgot, or neglected to check, that stands varied radically from south to north slopes.

Recent progress in photogrammetry promises to save the tired timber cruiser many miles of hiking thru swamp, burn, and waste areas. This great aid to cruising can not only save the cruiser time and trouble, but can also make his work much more accurate. Thru the interpretation of aerial photos, types, topography and physical features can readily be plotted. The author is not yet convinced that an accurate timber estimate can be made from contact prints, except perhaps in isolated cases of pure stands. A certain amount of ground work is still necessary to locate ground control for photos; to check on distribution of species, sizes, heights and amounts of defect. From the air a defective tree looks much like a sound one. For the forester with specialized training in photogrammetry, perhaps obtained while in service in the armed forces, there are many opportunities to

place this experience in forestry work. Several consultants in the west are finding plenty of business in mapping timberlands, logging chances, roads, cut-areas, and other features.

There is still plenty of demand for the independent cruiser if he will only locate the business. After he passes 50, the foot slogging gets a bit tough, for it used to be a saying with the cruising gang of the Canadian International Paper Company, "seven years in the woods and you were ready for the Home for Ancient and Crippled Cruisers." Depending upon the size of the tract, the cruise will vary from 100 percent for the small woodlot to the extensive reconnaissance cruise. Many a timberland owner has been sold on a detailed cruise after the forester made a light reconnaissance to show that there was enough timber present to make the added work worthwhile. On the other hand owners have been saved needless expense because a light cruise showed the timber too small, scattered or difficult to log to merit a detailed estimate. On a tract of 228,000 acres in southern Mexico, a reconnaissance showed an average of only 60 board feet per acre of valuable species; that the tract had been heavily logged before the present owners took over; that large parts were burned by hunters each year; and that most of the chicle had been systematically stolen. For one-tenth of the cost of an intensive survey, the needed information was supplied.

Of course, if the cruiser is to ramble in foreign countries a knowledge of the native language is helpful. Portugese is essential in Brazil; Spanish in other Central and South American countries. The author's Spanish, learned mostly by ear, is distinctly not the Castillian variety, but served well enough when he was out in the woods with a bunch of chicleros, and no interpreter at hand. His high school French, which no doubt sounded high fallutin', got by with the habitants of Quebec. Huberman (*3*) emphatically stated that there is a great need for forest consultants in Central and South Americas to locate, map, estimate, and assist in the development of huge timber tracts, most not yet explored.

Another opportunity for the estimator lies in assistance on legal cases. Timber trespass, damage, assessment and other cases require technical men to map areas, and to estimate the value of timber removed, injured or taxable. Appraisal of property in estates is often required, and this is where the cruiser comes in. Rarely will a public forester get involved in a court case which does not touch public forests. The independence of the consultant makes him the ideal investigator. And sometimes it's kind of fun, playing detective, as we found in locating the persons who had stolen some 40 tons of chicle in southern Mexico. Fees for court testimony are attractive, for $50 to $100 per day, plus expenses, is not exactly hay.

The fearful competition of public foresters who provide a number of free services is more fancied than a real bugbear. We have lost some work in New York to farm, Soil Conservation, and State foresters, but mostly on small tracts where returns are small, and the owners unwilling to pay much for services. The writer prophesied, when he was a member of the New York Section Committee on Forest Practice Standards, the basis for the present state Forest Practice Act, that the added publicity and the interest aroused amongst forest landowners would accrue to the benefit of the private forester. In the past two years we feel we have gained more business than we have lost, for this Act helps the small woodlot owner to the greatest degree; the holder of larger tracts turns to the consultant for some detailed help. Public foresters have yet to follow the timber all of the way from stump to mill, from plans and marking to scaling logs to pulpwood. These men feel they cannot serve the non-resident, non-operating, and to any large extent the big timber holders. Much work is turned over to consultants by the public foresters, which is outside of their field, if the consultant has made himself known to these men. Some consultants are almost starving because they have not contacted state and other foresters within short distances of their homes, so the state men turn the work over to better known private foresters.

Reforestation

With the S.C.S. and other agencies supplying free trees; state nurseries furnishing trees at costs; forest taxes adjusted or postponed in some sections; increasing public interest in tree planting; all point to the glowing opportunity for service by consultants in this field. One of the main drawbacks to greater reforestation has been the lack of labor, trained supervisors and relatively high cost of establishing a plantation. With the recent advent of tree-planting machines, the consultant can offer a real service to landowners wishing to put idle acres to work growing trees.

Along with the actual service in setting the

trees, the consultant can offer guidance in selection of species according to site and future crop; in preventing erosion and in providing shelter from wind and snow; in planning for fire protection; and in control of insects and diseases.

Investment of up to $800 may be required for one machine planter, plus costs of a tractor and a truck to haul both machines around, so that $4,000 may be the capital required to handle this job. This may be a high investment for only five or six weeks work in spring and again in fall. In the South, the planting season may run over a longer period.

It isn't all beer and skittles in this planting service for the consultant must be prepared to handle most of the details for the landowner. In cooperation with S.C.S. and state foresters, planting plans must be drawn; perhaps soils tested; sites inspected; some brush clearing or control advanced; and trees ordered. A well arranged schedule of planting must be prepared, with tree shipment correlated.

Wood Preservation

The field of wood preservation is usually considered the province of established timber treating companies. However, six consultants listed this service in the last published list (*1*) in the JOURNAL.

No doubt most of these men restrict their services to advice on problems in timber protection, especially for clients who use large quantities of posts, poles, piling, and other treated structural material. However, for those consultants with small mills and with facilities open to development, there should be an opportunity to develop a wood-treating plant using local material. Various treatments such as zinc-chloride, copper sulphate, and pentachlorophenol can be used with a relatively small investment in plant and equipment.

One farmer, not a forest consultant, but a long-time believer in and practitioner of good forestry, the late L. A. Fisher of Spencer, N.Y., treated fence posts of red pine by pentachlorophenol method under direction Extension Forester J. A. Cope in 1943. Thinnings from a plantation set in 1924 were cut in winter, then peeled with a drawshave and treated in a home-made tank utilizing old oil drums. These posts have been in the ground over 5 years, and show no signs of decay. When cedar posts are bringing 25 to 40 cents apiece, it would seem that treated posts of various local species could be produced to compete on both price and durability basis.

Wood Technology

This subject covers a wide range, from wood-seasoning to identification of timbers. The specialist in this field will work mostly with industries having problems connected with drying, working, and joining of veneer, furniture stock and other manufactured products. This man will require his own laboratory where checks can be made on moisture, stresses, gluing, and other techniques, as well as the making of microscopic examinations of woods for identification.

This technical forester may be called in on legal cases, to determine species, various kinds of damage to lumber, and to solve special problems. One company was requested by an insurance company to study a broken ladder; to determine stress and breaking load; and to determine if the manufacturer had used faulty materials. On the result of this investigation depended the decision in a case of disputed public liability insurance payments amounting to several thousand dollars.

Other Fields

The above general fields have been grouped from the JOURNAL's directory (*1*). By no means do they cover all of the possibilities for consulting foresters. With thousands of uses for wood, with multiple use of our forest resources being emphasized, and with the increasing realization of forest owners of the need for better handling of their holdings, the alert consultant can develop many opportunities to increase his service and his livelihood.

Other special fields not covered but offering a challenge might include tropical forestry, timberland brokerage, landuse problems, development of wildlife and other sanctuaries, preparation of exhibits, control of erosion, fur farming, collection of seeds and fruits and wood specimens, custom sawing, sales of greenhouse supplies, and lumber grading. One private forester complains that few young men will undergo the gruelling training and exposure to all kinds of weather to finish an apprenticeship in grading.

The opportunities are there. The field is wide. Let the consultant make his choice.

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Erosion Control on Palomar Mt. Observatory Road

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The road to the Palomar Mt. observatory presented unusual tasks in construction and a vexing problem of erosion control. After much damage to the road from soil losses, this problem was solved by the intensive use of vegetation on all road fills.

WHEN Palomar Mountain Observatory was dedicated June 3, 1948, Dr. Vannevar Bush, American wartime scientific leader and now head of the Carnegie Institute said: "It is a great truth of science that every ending is a beginning, that each question answered leads to new problems to solve." He was, of course, referring to man's search for a solution to the scientific mysteries of the universe; but in a lesser measure his remarks apply to the prosaic, but none-the-less essential problems of building the road to the "Big Eye" itself.

The construction of the observatory on Palomar Mt. in San Diego County made it necessary to build a road of higher standard than the existing roads in order to facilitate the movement of supplies and equipment needed in the construction of the observatory. Some of the structural parts, such as the horseshoe, the cage and the tube, reached the tremendous weight of 140 tons. The mirror alone weighs 20 tons, and the total weight of the telescope is 500 tons. The transportation of such weights complicated the engineering problem of road construction and required drainage structures of special design.

The topography of the area in which this road was constructed consists of steep mountain slopes, of which the majority are on south exposures. The soil is decomposed granite, most of which is very erosive.

Meteorologically, Palomar Mountain forms a very effective permanent "front" several times as steep as normally encountered when a storm area meets a natural front. When storms of the North Pacific cyclonic type or tropical storms strike this front, precipitation is usually of high intensity. From 1936 to 1938 the total annual amounts of precipitation were unusually large in this area, ranging from 32 inches to 2,800 feet elevation at the foot of the mountain to 70 inches at the crest of the grade, where the elevation is 5,200 feet. However, normal precipitation at these two points is 25 and 45 inches.

The Palomar road starts at Cuca Mesa, on the Pala-Lake Henshaw State Highway, and terminates at the observatory site, a distance of 12 miles. Its minimum width is 28 feet, and the curves have a minimum radius of 100 feet. The maximum grade is 9 percent on the 7-mile section of road from Cuca Mesa to Crestline, at the crest of the mountain. On the 5 miles from Crestline to the observatory site, the maximum grade is 7 percent.

Road construction was divided into three sections, involving approximately 750,000 cubic yards of excavation. From 1933 to 1938 the County prison camp moved 200,000 cubic yards; from July 1935 to August 1937 the County Road Department moved 400,000 cubic yards; and from March 1936 to May 1937 the State Division of Highways moved 150,000 cubic yards. The state constructed all road fills in compacted layers of a thickness of 12" and with a slope angle of 1.5:1. All road fills constructed by the county were "end-dumped" by trucks.

From 1934 to 1938, 80 men, the entire personnel of the county prison camp, were engaged in rebuilding the road and refilling slopes on the lower section of the road, which washed out during the winter months each year.

In order to have the road completed in 1937, when it was most needed for transportation of heavy equipment and steel structures for the observatory construction, additional manpower was assigned to the road building. The County Road Department assigned a road crew of 50 men with equipment to the road, and Basich Brothers of Los Angeles, who were awarded a contract by the State Highway Department to construct a section of the road, established a camp of 200 men with equipment at the observatory site.

In March 1937, erosion damage to the fill slopes was roughly estimated to be about 24,000 cubic yards, mostly on the partly completed lower four-mile section of road. Up to that time no attempt had been made to control this erosion permanently. Erosion control on fill slopes was considered practically impossible. It was then proposed to abandon the entire road project and build a new road on the east or desert side of the mountain, where the rainfall is not so heavy. The thought was that a road built in this loca-

tion would suffer less erosion damage. However, in May 1937 John Cole, Assistant Road Commissioner of the County Road Department, decided to attempt erosion control experimentally on a few fill slopes. These were completed in February 1938.

Definite methods of erosion control had been developed by the U. S. Forest Service.[1] In addition, information was available concerning European practices in this field. The general method employed consisted of contour wattling (bundles of brush 6 to 7 feet long and 4 to 6 inches in diameter placed end to end in contour trenches), seeding of barley or rye, the use of long wheat straw between rows, and the planting of willows, mulefat, trees and shrubs.

A high intensity rain storm on March 1-3, 1938, when 19 inches of rain fell in 24 hours at 4,500 feet elevation, practically washed out the entire road. The only fill slopes which did not erode were protected by erosion control measures, 4 acres in total area. Two of these slopes had been refilled, staked and wattled only two days before the storm. As an example of soil loss on unprotected fill slopes during this storm, on a 70-percent slope with an area of 0.25 acres 170 cubic yards were lost; this is equivalent to an average depth of 5 inches over the area.

After the storm a survey revealed total soil loss of 92,000 cubic yards. Of this loss, at least 25,000 cubic yards can be considered to have been caused by slides, drainage failures and the breakdown of shoulder berms, and 67,000 cubic yards were due to action of rainfall on the unstable fill slopes.

On the eroded section of the road built by the State Highway Department, a total of 138,500 cubic yards had been excavated. With a soil loss of 17,387 cubic yards, 12½ percent of the total excavated yardage was removed. The original construction cost of this 3-mile section of road was $297,000. The additional expense for refilling, estimated at the very low cost of 50 cents per cubic yard, totals $8,683.50 or 2.9 percent of the original construction cost. This heavy damage required considerable material for refill. As all available fill material had been used previously, the necessary volume was secured from borrow pits at three locations adjacent to the road.

In May 1938, the County Road Department decided to go ahead with drainage improvement and erosion control work on all fill slopes over the entire road. The labor was furnished by the prison camp and technical supervision by the Road Department. The total area to be controlled amounted to 22 slope acres, and the man-days required for stabilization amounted from 200 to 500 man-days per acre. Much of this time was spent in refilling, smoothing, reshaping, and otherwise preparing the slope before the wattling operation. Drainage improvements consisted of replacing some of the culverts with larger ones and the placing of additional culverts. In order to limit the runoff from the road bed to shorter distances, 170 open-type drains were constructed along the entire length of the 12-mile road, at an average spacing of 410 feet. All of the drainage outlets were protected by a rock talus or heavy riprap to prevent gouging. On the switchbacks, where slides from fill slopes on the upper portion might damage the lower portion of the road, dry-rock retaining walls were constructed at the toe of the road fills.

Planting of the road fill slopes required a large number of native shrubs and trees. A "wild plant nursery" was therefore established at the prison camp near the foot of the road grade. About 5,000 trees and shrubs were contributed to the project by the California Forest and Range Experiment Station.[2] During the planting stage of the project much valuable information and advice were received from C. J. Kraebel of the station.

An attempt was made throughout the project to plant the slopes with species ecologically suited to the planting sites. In order to measure the efficiency of certain species and their usefulness in controlling erosion, some of the contributed native plants were planted in sample plots at various locations. From subsequent inspections of these plots in 1939, 1946, and 1948, much valuable information was obtained as to the cause of death or injury to the various species planted and to their ability to exist on various sites (soil, exposure and elevation).

In 1939, 10 months after the original planting, the principal causes of death or injury were found to be trampling by cattle and deer, heavy rodent population, drought, and the practice of work crews to dump slide material over the planted slopes. Sugar bush, *Rhus ovata*, planted

[1]Kraebel, Charles J. Erosion control on mountain roads. U. S. Dept. Agric. Circ. No. 380. March 1936.

[2]Forest Service, U. S. Department of Agriculture, Berkeley, Calif.

at elevations of 4,500 feet and above was severely damaged by frost.

The most successful species planted below 3,500 feet elevation on south exposure and dry sites were Arizona cypress, *Cupressus glabra;* Monterey pine, *Pinus radiata;* Knob cone pine, *Pinus attenuata;* Sugar Bush, *Rhus ovata;* Mahogany sumac, *Rhus integrifolia;* and Nevin Hollygrape, *Berberis nevinii.* Mulefat, *Baccharis viminea,* planted as cuttings, was growing excellently at all elevations. The first three photographs show the successful re-establishment of vegetative cover on a fill slope at an elevation of 3,500 feet; note the dry rubble retaining wall at toe of road slope.

Planting at the higher elevations (5,000 to 5,500 feet) presented different problems due to differences in temperature, site, and soil. Of the species planted on these areas the most successful were black locust, *Robinia pseudoacacia;* knobcone and Coulter pine; catalpa, *Catalpa speciosa;* redbud, *Cercis occidentalis;* Siberian pea tree, *Caragana siberica;* and mountain mahogany, *Cercocarpus betuloides.*

On August 1946 a second inspection was made, to examine this satisfactory erosion project and to apply the resulting knowledge to control work on the Los Angeles River Flood Control Project.

The 1948 inspection revealed that on several locations plants had been destroyed and fill slopes damaged due to slide material which had been dumped by road maintenance crews. Unless this practice is discontinued, it will no doubt result in another cycle of erosion, eventually leading to the loss of the slopes. After 8 years of vigorous growth the mulefat (*Baccharis*) was definitely dying out on road slopes up to elevations of 3,500 feet, but was being replaced by invasion of native grasses, deer weed, buckwheat

FIG. 1.—Retaining wall and eroded slope at an elevation of 3,320 feet. March 7, 1938.

FIG. 3.—Planted species show exceptional growth, and the slope is well stabilized. August 28, 1948.

FIG. 2—Same slope, wattled and planted. August 15, 1939.

FIG. 4.—In 1948, the planted vegetation showed exceptional growth.

and a heavy growth of black and white sage. The plantings showed exceptional growth on many species. As examples the cypress and black locust had reached a height of 20 feet, while the pines ranged from 6 to 15 feet, and sugar bush was 5 feet high with a spread of 8 feet. All were in very healthy condition with lush foliage (Fig. 4).

The erosion control work on Palomar Mt. road was the first ever conducted in San Diego County, and for that reason methods had to be developed as the work progressed. As there were no definite erosion control plans drawn up with the road specifications, the cost of the work was much higher than it would have been if done during the original road construction. Since control was completed in 1941 there has been no damage from erosion to the road and fill slopes, and the control work can be considered entirely successful. It proves that the millions of fine roots from planted vegetation can do the work of holding the soil effectively, and infinitely cheaper than more elaborate steel and concrete structures.

And so the balance of nature, which man had destroyed, has again come to Palomar Mountain, where the great "eye" will bring new worlds closer to the scientific investigator.

Results of Thinning Experiment in Ponderosa Pine Pole Stands in Central Arizona

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Results of a twenty-year study in ponderosa pine suggest that thinning may shorten the sawtimber rotation by as much as thirty years.

THE PONDEROSA pine forest type occurs over wide areas in the vicinity of Prescott, Ariz. About 75 years ago when mining was an active industry in this locality, many of the virgin pine stands were practically clear cut. Subsequently the cut-over areas became stocked to dense stands of seedlings from seed produced by occasional defective trees left standing. With the creation of the Prescott Forest Reserve[1] these lands were placed under the jurisdiction of the United States Government. Since then they have been protected against fire and are now well stocked with trees of pole size, mostly of the same age but varying considerably in both diameter and height.

In 1925 a thinning was made in a 40-year-old even-aged stand. This involved, for the most part, the removal of declining and deformed large trees, rather than smaller, suppressed, and intermediate trees. A plot of 4.2 acres (A) was laid out in this thinned stand. Immediately adjoining the thinned plot, an unthinned plot of 0.8 acre (B) was established. Because it appeared that this plot was on a poorer site than the thinned plot, another control plot (D) of 0.24 acre was established in 1930.

In 1935 "crop trees" were selected from among the thrifty dominants in both thinned and unthinned stands at rates of 60 to 90 per acre. In general, the crop trees were superior in form and well spaced over the study area. Although the stand is essentially even-aged, management aims to convert it eventually to a selection forest through periodic partial cuttings. Under this plan the selected crop trees will furnish the basis for the first two or three sawtimber harvests and the surviving "non-crop" trees will be available for later cuts. The purpose of the study was twofold: (*1*) To determine if thinning will appreciably shorten the period of years required for crop trees to reach sawlog size, and (*2*) to provide a comparison of the numbers and volume of trees (crop and non-crop) that will periodically be available for cutting in thinned and unthinned stands. The full story will not be told until several decades

[1]The Prescott Forest Reserve was created on May 10, 1898. On July 2, 1908, it was consolidated with the Verde Forest Reserve under the name Prescott National Forest.

have passed but the 20-year record now available provides a number of indications of what may be expected.

Pearson[2] has reported results based on the first 10-year period of growth. He found that:

1. During the 10-year period 1925-35 the average diameter growth of all trees was about 0.45 inch more in the thinned stand (plot A) than in the unthinned stand (plot B).

2. Diameter growth of crop trees was about 1.3 inches on the thinned plot and about 0.8 inch on the unthinned plot. On both plots the growth of these trees was practically the same throughout the range of diameter classes represented (6 to 12 inches d.b.h.).

3. On both plots the best diameter growth was made by the larger trees, this being attributed to the fact that the larger trees are mainly dominants.

4. The net basal area increment on the thinned plot was 36.5 percent greater than that of the unthinned plot, this despite the fact that the basal area of the thinned plot in 1925 was only 0.7 that of the unthinned plot. The better showing of the thinned plot was attributed in part to its having more large trees, especially trees above 10 inches d.b.h.

Immediately following the third remeasurement, the thinned plot was divided into two equal parts of 2.1 acres each. This was done in order to establish two thinned plots of the same site quality but differing in numbers of trees reserved. On one part of this plot, now designated as plot A-1, 51 trees (mostly small) were cut and 6 were poisoned. On the other part, now designated as plot A-2, a few small trees were cut because of twig blight. The crop trees on the thinned plots were then pruned to a height of 17 feet above ground line. Removal of additional trees on plots A-1 and A-2 left most of the reserved trees, non-crop as well as crop trees, fairly well released. In contrast, on the unthinned plots there is severe competition, not only among the crop trees themselves but also from some of the non-crop trees.

The present article presents results based on the 10-year record of growth since the time the plots were treated as described above.

Character of the Plots

The site quality of the two thinned plots (A-1 and A-2) and of one of the unthinned plots (D)

[2]Pearson, G. A. A thinning experiment applied to timber stand improvement. Jour. Forestry 34:855-861, illus. 1936.

TABLE 1.—TEN-YEAR DIAMETER GROWTH OF CROP AND NON-CROP TREES IN THINNED AND UNTHINNED PONDEROSA PINE POLE STANDS 1935-45

Diameter classes	Thinned plots				Unthinned plots				Thinned plots				Unthinned plots			
	Diameter growth per tree				Diameter growth per tree				Basis—trees				Basis—trees			
	A-1		A-2		B		D		A-1		A-2		B		D	
	Crop	Non-crop	Crop	Non-crop	Crop	Non-crop	Crop	Non-crop	Crop	Non-crop	Crop	Non-crop	Crop	Non-crop	Crop	Non-crop
Inches	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
1-3	—	0.38	—	0.30	—	0.19	—	0.16	—	5	—	4	—	127	—	16
4-7	0.90	0.73	1.00	0.73	0.68	0.40	0.60	0.35	4	237	19	191	6	309	3	92
8-11	1.16	0.94	1.12	0.93	0.84	0.71	0.88	0.68	85	152	123	111	36	60	11	25
12-15	1.20	0.96	1.08	0.96	0.74	0.50	1.10	0.10	40	19	46	7	5	3	1	1
16+	—	—	0.70	—	—	—	—	—	—	—	2	—	—	—	—	—
All diameters	1.17	0.81	1.13	0.80	0.81	0.38	0.84	0.39	129	413	190	313	47	499	15	134

is the same. That of the other unthinned plot (B) is slightly different. In 1935, when the trees were 50 years old, the average height of the largest trees (12 inches d.b.h. and over) on plot B was 41 feet; on the other three plots, 45 feet. This would indicate a site quality between IV and V.[3]

Structurally, the two thinned and unthinned plots are similar. They differ, however, with respect to numbers of trees and basal area. In 1945 thinned plot A-1 had 61 crop and 197 non-crop trees per acre and thinned plot A-2 had 90 crop and 149 non-crop trees per acre. Of the two unthinned plots, plot B had 59 crop and 624 non-crop trees per acre and plot D, 63 crop and 558 non-crop trees per acre.

[3]Using the site classification developed by Walter H. Meyer for ponderosa pine in the Pacific Northwest.

Diameter Growth

As shown in table 1, both crop and non-crop trees grew more rapidly in diameter in the thinned stand. The difference in 10-year diameter growth was not large, however, averaging about 0.3 inch for the crop trees and 0.4 inch for the non-crop trees. The relative effect of release was greatest in the case of the smaller non-crop trees. On all plots, both thinned and unthinned, the larger trees made the best diameter growth. This is typical of most even-aged stands.

Height Growth

Table 2 shows that height growth of both crop and non-crop trees has been greatest on the thinned plots. The average difference amounts to about 2 feet in 10 years. This is

TABLE 2.—TEN-YEAR HEIGHT GROWTH[1] IN THINNED AND UNTHINNED POLE STANDS

Diameter classes	Height increment (10 years)			Basis—trees		
	Crop trees	Non-crop trees	All trees	Crop trees	Non-crop trees	All trees
Inches	*Feet*	*Feet*	*Feet*	*No.*	*No.*	*No.*
			Plot A-1 (thinned)			
4-7	—	5.1	5.1	—	16	16
8-11	6.7	5.6	5.9	7	18	25
12-15	6.6	6.5	6.6	5	2	7
All diameters	6.7	5.4	5.7	12	36	48
			Plot A-2 (thinned)			
4-7	6.7	6.7	6.7	3	6	9
8-11	6.5	6.6	6.5	18	8	26
12-15	6.8	7.5	6.9	10	2	12
16+	6.0	—	6.0	1	0	1
All diameters	6.6	6.8	6.6	32	16	48
			Plot B (not thinned)			
4-7	—	4.6	4.6	—	13	13
8-11	4.7	5.6	5.2	6	7	13
12-15	3.0	4.0	3.2	3	1	4
All diameters	4.1	4.9	4.7	9	21	30
			Plot D (not thinned)			
4-7	—	3.3	3.3	—	9	9
8-11	5.0	5.3	5.3	1	3	4
All diameters	5.0	3.8	3.8	1	12	13

[1]Based only on the heights of trees measured in both 1935 and 1945.

attributed to the denser stocking and increased competition for soil moisture in the unthinned plots. It is conceivable that where moisture is the critical factor, height growth as well as diameter growth would be retarded.

No consistent differences in height growth were apparent between crop and non-crop trees, or among the various diameter classes represented.

Basal Area Increment

The 10-year basal area increase in square feet and in percent is given in Table 3. Since basal area is a better index of wood volume than either diameter or height, the figures are indicative of total yields for the thinned and unthinned stands during the 10-year period.

In terms of growth percent, the thinned stands made a much better showing than the unthinned stands. In terms of actual basal area increase, however, the differences in 10 years are small and average less than 2 sq. ft. per acre.

TABLE 3.—BASAL AREA INCREMENT PER ACRE AND INCREMENT PERCENT IN THINNED AND UNTHINNED STANDS[1]

Plot	All trees		
	Basal area (1935)	Increase (10 yrs.)[2] Basal area	Percent
	Square feet	*Square feet*	
A-1 (thinned)	103.6	23.0	22.2
A-2 (thinned)	96.0	22.2	23.1
B (unthinned) ...	125.6	19.8	15.8
D (unthinned) ...	150.0	21.7	14.5

[1]Includes only trees 4 inches d.b.h. and over.
[2]Period 1935-45.

Total wood production was, accordingly, about the same but it was concentrated on fewer stems in the thinned stand.

Discussion

An appreciable gain in diameter and height growth indicates that thinning operations can be expected to shorten the period of years required for the crop trees to reach sawlog size. Assuming that the objective is to produce sawtimber trees 20 inches d.b.h. and that the present difference in diameter growth could be maintained through periodic thinnings, the rotation would be shortened by perhaps 30 years. This gain would probably not justify thinning as an economic operation in ponderosa pine pole stands in central Arizona unless a market for small stems can be developed.

Since basal area increment was not reduced as a result of thinning, it is evident that the trees reserved were sufficient in number and spaced well enough to make full use of the productive capacity of the site. If even-aged management were contemplated, a slightly heavier thinning (to a basal area of 70 or 80 square feet) might be desirable to further accelerate the growth rate of crop trees. However, since the long-time objective is the development of all-aged stands, substantial numbers of the smaller non-crop trees will need to be retained for second and later cuts. The number of crop and non-crop trees that will be lost through mortality or that can be successfully carried through to sawtimber size is at present a matter of conjecture. This important phase of the study will need to be closely followed in the future.

Grants Paid to Encourage Pitwood Production from Thinnings in Britain

A notice has been issued by the Forestry Commission in Great Britain as follows:

"As recently announced in Parliament on behalf of the president of the Board of Trade, it has been decided that a grant is to be paid to private owners of woodlands to encourage the thinning of plantations and so to maintain the total production of homegrown pitwood at a time when it is necessary still further to restrict clear felling.

"The grant will take the form of payment of 3d. per cubic foot standing, for produce removed in thinnings of conifer plantations. An alternative basis for payment at the rate of 3£ 5s. per acre will be available at the option of the owner, subject to a minimum area and outturn."

"The Use of Copper Naphthenate Treated Burlap in Forest Nursery Operations"

D. A. Anderson and G. U. Kinneer

Respectively, chief, Division of Silvicultural Research, and research technician, Texas Forest Service, The Texas A. & M. College System, College Station.

Burlap used for protecting nursery seedbeds during the germination period may safely be treated with copper napthenate as a preservative. Burlap so treated is not toxic to pine seedlings and may last at least four times as long as untreated material. Cost of treatment is but a fraction of the cost of new burlap.

JUTE BURLAP (*1*) is used extensively by many state and federal forest tree nurseries to facilitate germination and protect newly sown seed beds during the initial growth period of the tree seedlings. The extremely rapid rate of depreciation which burlap has shown at the Texas Forest Service Indian Mound Nursery, Alto, Texas, prompted this organization to seek possible means of preserving this material for longer service life. Ordinarily four years is the maximum service than can be expected under our climate and nursery practices. Through the Division of Silvicultural Research of the Texas Forest Service, the possibilities of several chemical preservatives for this purpose were investigated.

In order to find a successful preservative it was necessary to consider only those chemicals which would be economical to use, of practical application, nontoxic to the seed and germinating seedlings, and which would remain fixed within the burlap material over an extended period. Inquiry was made of the National Bureau of Standards, U. S. Department of Commerce; Division of Cotton and Other Fibre Crops of the U. S. Department of Agriculture; the major chemical companies in the United States and the Quartermaster Research and Development Laboratories, Department of the Army. From these sources information and experimental data were received which enabled an evaluation of the various chemicals that were currently available and had possibilities for the use intended.

After study and some informal tests at the nursery, two chemicals, namely, copper naphthenate and copper tallate, were selected as the most likely compounds which would fulfill the requirements. Their selection also resulted from a review of experimental work carried on by other investigators and reported in the several references listed.

The work of Dean, Strickland and Berard (*2*) illustrated clearly the effective service in days which could be expected from copper naphthenate-treated 7-ounce cotton osnaburg sandbags. During March 1948 burial methods of testing as suggested by these investigators were utilized to test the relative effectiveness of copper naphthenate and copper tallate preservatives on 8-ounce jute burlap material being utilized at our Indian Mound Nursery. In addition, treated burlap strips were used to cover experimental seed beds to ascertain the effect on seed and germinating seedlings.

Our experimental burial tests of burlap strips treated with copper naphthenate and copper tallate have indicated the excellent mildew-proofing qualities of these chemicals. The first examination of strips buried on March 18 was made on July 23. At this period, 128 days after burial, the condition of treated strips did not indicate signs of decay and the fibres were in extremely good condition. Control strips had completely disintegrated during this period.

A second phase of the study, to test treated burlap materials being used on pine seedling beds, was carried out during March 1948. Six experimental plots, each 6 feet in length, were laid out within four-foot-wide nursery beds. Two plots were covered with copper naphthenate-treated burlap, two with copper tallate-treated burlap, and the remaining two with untreated burlap to serve as check plots. The plots were each sown to equal amounts of slash pine (*Pinus caribaea*-Mor.) seed on March 18 and normal nursery practices were followed during the germination period. Our observations indicated that the seedlings produced in beds covered with the chemically treated burlap were comparable in number, quality and development to those seedlings produced in the check plots.

Based on preliminary experimental results, the Texas Forest Service utilized copper naphthenate (8.0 percent solution) for treating 18,000 yards of new 56-inch, 10-ounce burlap material during November 1948 on a large-scale basis. This chemical was selected because it gave highly satisfactory results in preliminary tests and was available in sufficient quantity

on the market for our treating operations.

Experiences of other investigators have indicated that a retention of 0.7 to 1.0 percent metallic copper is required to obtain good preservation of burlap material. The 8.0 percent copper naphthenate used in treating the burlap was diluted with mineral spirits to a metallic copper content of 1.5 percent based on recommendations of the manufacturer (*5*). This solution was prepared using a dilution ratio of 1 pound of 8.0 percent copper naphthenate to 4.33 pounds of mineral spirits. The solution prepared in this manner gave a desired metallic retention of approximately 1.0 percent in the burlap under controlled treating conditions.

The equipment necessary for treating operations can be constructed readily at a very small cost (Figs. 1 and 2). For this particular treating operation a used 550 gallon gasoline tank was converted into an open treating tank by cutting off a lengthwise portion about six inches below the top. At one end of the tank a homemade wringer attachment was used similar to that found on conventional type washing machines. Rollers for the wringer were made from eight inch diameter veneer cores obtained locally, with the wringer approximately twenty-four inches in length.

Within the tank a wooden frame with rollers attached was constructed in such a manner as to allow passage of the burlap material through the tank at an approximate distance of six inches from the bottom. This frame was arranged with hinges on one side so that it could be pulled up during the burlap threading operation. This also allowed the treating crew to keep their hands away from the copper naphthenate solution during the operation, since it will irritate the skin. As the burlap was fed into the tank from one end it was folded over twice to allow passage through the tank and wringers. Thus the actual width of burlap strips passing through the tank was approximately eighteen inches during the treating process. Immediately to the right of the wringer a device for rolling up burlap in regular nursery operations was used to roll up the treated material as it came from the wringer.

Provisions were made to collect excess solution which was not wrung out by the wringers, and this solution returned to the treating tank. Treated rolls were transferred from the roller to a small trailer. Three pieces of corrugated aluminum roofing were placed on the floor of the trailer to allow for the collection of any additional solution which drained from the burlap rolls. The treated rolls were then taken to a drying area where they were unrolled, spread out and allowed to dry. After thorough drying the burlap strips were rolled for storage in the normal manner.

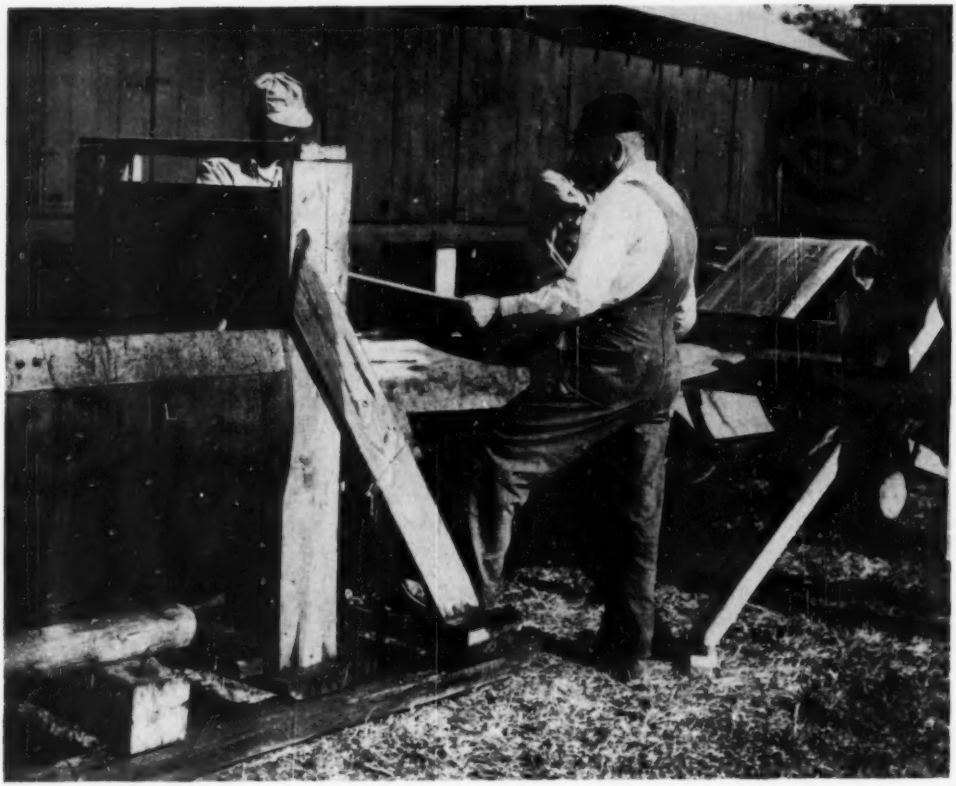
A major factor in obtaining the desired deposition of copper is the method of application, since the percent of preservative retained will be in inverse proportion to the pressure of the wringers used to eliminate excess solution during the treating process (*6*). The desired deposition of 1.0 percent metallic copper will be obtained by using a copper naphthenate solution containing approximately 1.5 percent metallic copper, if the retention of the chemical solution approximates 50 percent (by weight) of the treated burlap.

An analysis of treating costs was made to determine the relative merits of preservative treating in contrast to the increased service life of the burlap material which can be expected. These figures show that chemical treatment is practical and economical.

Records were made on the amount of copper naphthenate and mineral spirits required to treat 3,500 yards of 56-inch, 10-ounce jute burlap material. The costs for these materials were $116 based on current market prices. This represents a cost for mineral spirits and copper naphthenate of 3.3 cents per lineal yard of burlap material treated.

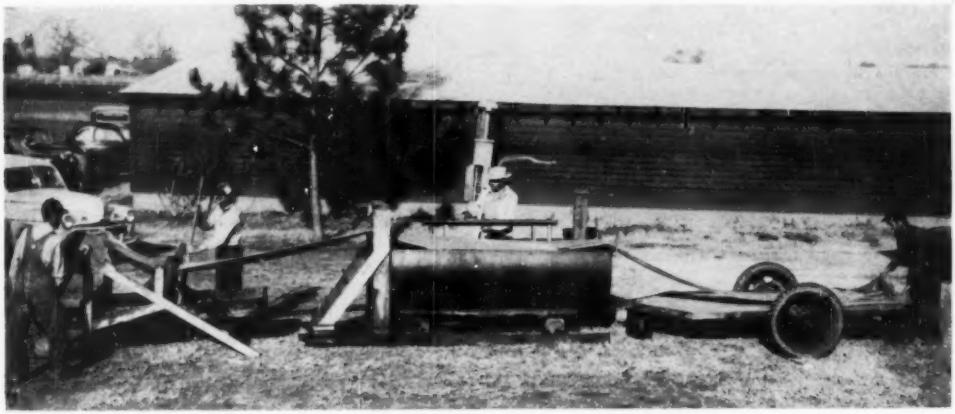
The treating crew was made up of five men. Two men were stacking and folding burlap as it went into the treating tank; two men were rolling up and transferring treated burlap to the trailer. A crew foreman supervised the entire operation and assisted where necessary. Experience gained in this treating operation indicates that approximately fifty man-hours are required to complete all necessary operations on 2,000 yards of burlap, from stacking burlap to be fed into the treating tank through the last operation of rolling up the burlap for final storage. The cost of labor at an average of 75 cents per hour based on these figures will be approximately 1.8 cents per lineal yard. Combined costs for materials and labor were 5.1 cents per lineal yard. Adding .1 cent per lineal yard for overhead expenses, cost and depreciation of equipment, etc., the total cost is approximately 5.2 cents per lineal yard.

It can be reasonably assumed from our experimental work and the results of other workers with treated burlap that the service life will be



Texas Forest Service

FIG. 1.—Close-up view of treated burlap as it passes from treating tank to wringers and thence is rolled for transfer to the drying area. The tank beneath rolling apparatus collects excess copper napthenate as it drains from burlap rolls.



Texas Forest Service

FIG. 2.—The complete set up for burlap treatment, right to left; (1) folding burlap for passage through treating tank; (2) treating tank and wooden frame which submerges burlap in the tank; and (3) rolling burlap for transfer to drying area.

increased by 400 percent or more over untreated burlap material. The cost of treating, including labor, is approximately 18 percent of the cost for new burlap material at current prices. Estimated depreciation rate in the past for nontreated new burlap material has been approximately 25 percent per year. For 18,000 yards of new burlap this represents a total depreciation cost per year of $1260 based on current market prices. Copper naphthenate-treated burlap depreciation as calculated from the experimental results will amount to $375 per year when all costs of treatment have been included with the current cost for burlap. This will result in savings of $880 per year in depreciation costs for 18,000 yards of burlap material. Particular mention should be made of the fact that the quantity of burlap upon which this saving is calculated will be sufficient to protect about four million pine seedlings during any one nursery season when the burlap is used but once. Considering present demands on the average state or federal nursery to be twenty million trees, the preservative treatment of burlap material under similar climatic conditions would result in $4400 per year savings in depreciation costs for a production of this size.

Summary

Tests were made during the spring of 1948 at the Texas Forest Service Indian Mound Nursery near Alto, Texas, to determine the possibility of utilizing chemically treated burlap material to increase its service life and lower nursery operating costs. The results of this work indicated that there is no injury to seedlings during the germination period when copper naphthenate-treated burlap material is used as a seed bed cover. Furthermore, the tests show a remarkable increase in service life of chemically treated burlap material.

New burlap material to be used during the spring 1949 nursery season was chemically treated by the method previously described. The cost data procured on this work indicates conclusively that labor and material costs will be under 5½ cents per lineal yard of burlap material. When this cost is compared with the high rate of depreciation for burlap material, a considerable saving is evident from the use of copper naphthenate as a preservative. The practice of treating burlap material at the Indian Mound Nursery may well be adapted to operations of other nurseries throughout the United States.

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Notes

Rules of Thumb in Forest Management

The three blind men and the elephant—and confusion. Minimum cutting practices, DX rules or rules of thumb—and confusion. We devise *rules of thumb, minimum* practices, then ignore the common meanings of the words, and, to use the Army term, everything is "Snafu." One group of professional foresters has adopted all such rules as the ultimate in forest management, another group bitterly condemns them as of the devil's own invention, a third, confused by the uproar, strives to ride the fence and pays lip service to both sides, and yet another, thinking clearly and objectively, accepts them for the purpose they are intended and uses them accordingly.

It would seem that, all too often, controversy is based on ignorance and nursed on rumors. We fall in easily with preconceived ideas and close our mind to arguments or facts that may refute ideas acquired by rationalizing from a wrong premise. A closed mind cannot recognize a new approach, or adjust to a change in thinking or a change in conditions.

The trend in the most progressive areas has already passed the stage where simple forest practice rules are the major guides in actual forest management. However, to say flatly, as some do, that simple rules or practices have no place in forestry is ridiculous. Simple rules will have a definite place in forestry for some time to come. Even simple practices are not now being applied on the majority of private forest land. In fact, the general public still thinks of the forester more or less as the ranger fighting fires, planting trees, or managing recreation and hunting areas. Simple forest rules are one method of educating the public to the fundamental role of the professional forester, the economic production of a vital resource—wood.

Rules of thumb or guides to practices are, moreover, a great help to farm planners in the Soil Conservation Service. These technicians are not trained foresters, but are called upon to apply forestry practices to the farm woodlot. Extension forestry specialists can use these rules also in demonstrating and illustrating simple practices at their group meetings, where the intricacies of practice for the best forest management would be too involved. As a field man, I have contacted several woodland owners who have applied good cutting and thinning measures that they had heard discussed by extension foresters, or read about in some popular magazine, newspaper article, or farm periodical. It was the simple rules which impelled them to practice forestry in their woodland and later to seek professional advice and assistance on some specific problem.

The practicing foresters who have taken rules of thumb and minimum practices and attempted to apply them in sections where relatively intensive management is already being practiced, are to put it mildly, backsliding. Perhaps they may be excused. Perhaps they are attempting to substitute these rules for unearned experience in forest management. There is no easy way to become proficient in intensive woodland management, no way to substitute for years of practice in even one type, out where it counts—in the forest. Experience gained in the swivel chair from a complete file of literature on the white pine type for example, is not much help if the forester cannot recognize the conditions in the field, and know how to work with them to achieve the desired end. Public and private foresters charged with applying intensive forestry practices are doing the profession a great disservice if they are content to apply only simple rules or minimum practices. Minimum practices are not the goal for *foresters*. Their chief value is in educating *non-foresters* or *landowners*, and in introducing them to the practice of forestry.

Simple rules are educational measures necessarily preceding economic forest management. They are a means for making the general public cognizant of forest values and the measures needed for the maintenance of a basic natural resource. Silvicultural forest management is still, and always has been the proper role of the professional forester. Forest fire protection has been the only widespread and really active management practice to date. Widespread silvicultural management will follow; simple rules and minimum practices are but the beginning, and can serve to lead the way. It is time now for the tail to stop wagging the dog. Silvicultural management is the dog in our national forest picture, and all other practices such as

recreation, wildlife, utilization, and reforestation are the tail.

GLENN E. SMITH,
Soil Conservation Service.

A Field Mapping Device

A map board found useful in the Lake States in its simplest form consists of three parts, a piece of plywood, a piece of cross-section paper, and a circular disk of clear plastic material. The dimensions of the parts can be varied to suit the uses desired. The dimensions used here were found satisfactory for mapping to a scale of four or eight inches to the mile. The board, of one-fourth inch plywood, is eight inches by ten inches and the disk has a diameter of eight inches. The thickness of the plastic should be about .05 inches.

Construction of the Mapper

To construct the board, first fasten the cross section paper (K & E 10x10 to the inch) to the plywood board with thumb tacks or staples at the corners, so that the intersection of two of the heavy lines is centered on the long axis of the board, four inches up from the bottom. Next thoroughly buff the upper side of the plastic disk with emery cloth or rubbing compound to give a dull finish which will permit legible writing with a medium-weight lead pencil. Then drill a hole in the exact center of the disk. This hole should be just large enough to fit the shank of a thumb tack without any play. The head of the tack serves to hold the disk onto the board and as a means of removing the disk.

The next step is to calibrate the disk. This can be done most simply with a transparent paper map protractor of the type used on fire maps. The protractor should be pasted on the disk with rubber cement, with the center of the protractor and the center of the disk in careful alignment. The disk should then be fastened with the thumb tack through the center hole to the board upon which the cross section paper has already been placed. The 360 degree marks on the protractor can then be transferred to the edge of the disk. These degree marks should be scratched on the *unbuffed* side of the disk. The marks can be numbered for bearings, azimuth, or both, but numbering must run clockwise for azimuth, or the east point must be to the right of north. Every ten degree mark is numbered. All numbers divisible by 5 are represented on the periphery of the plastic disk by marks about 3/16 inches long. All other degree marks are about half that long, to facilitate accuracy and ease of reading. An easy way of numbering every tenth degree is to mark it with pencil on the upper part of the disk, then to turn the disk over and scratch the outlined figures with a sharp tool. The incised marks can be made to stand out more boldly by inking them in with a fine crow quill pen or spreading on printers ink and rubbing the excess off with a cloth immediately after application. Cardinal directions can be inscribed beside the proper azimuth.

Those who do not wish to make their own mapper, can purchase a similar device.[1]

Technique of Using the Board

The technique of using the board is simple and easily learned even by inexperienced men. First, the "N" (north) or "O" (zero degrees) point on the disk is placed over the line on the cross section paper running through the center of the disk along the long axis of the board. A short line is put on the paper above this point with the letter "T" (true north) above it. Next the disk is turned until the magnetic declination appears under the "T" line. Another short line is now drawn on the paper above the "N" or "O" point on the disk, with the letter "M" (magnetic north) above it. In Figure 1, a magnetic declination of 2½ degrees east has been plotted. If the compass used in the survey has been corrected for magnetic declination, all subsequent settings on the board will be done on the "T" line. If no declination correction has been made, settings will be done on the "M" line. In either case, the resulting map will be oriented to true north.

Mapping

When the device is used for mapping, the first step is to trace or otherwise plot to scale on the disk, all known features pertinent to the map, such as known corners, section lines, etc. Figure 1, shows the NE¼ of Section 28, T38N, R12E, plotted to a scale of eight inches to one mile, with the boundaries of a timber sale area being mapped. After the tracing, a start is made from a known point or corner, placing a dot marked "A" on the disk at this point. A

[1]This device or an adaptation of it is now being offered on the market as the Reinhardt Redy-mapper at a cost of $4.95. It is manufactured by the Woodsman Tool Co., Route 1, South Tacoma 9, Washington.

compass reading is taken to the next point. The azimuth read on the compass is set on the "M" or "T" line and a line is drawn on the disk towards the top of the board and parallel to the vertical lines on the cross section paper. The distance to the point is then measured. This distance is laid off to scale on the line just drawn and a dot marked "B" is placed on the board at this point. Features can be sketched in a long line AB. The azimuth to the next point is now read and set on the "M" or "T" line. Another line is now drawn towards the top of the board parallel to the vertical lines on the cross section paper, but this time from point "B". The distance is then measured and plotted and point "C" is established. This procedure is repeated for each course until the traverse is closed or the map completed.

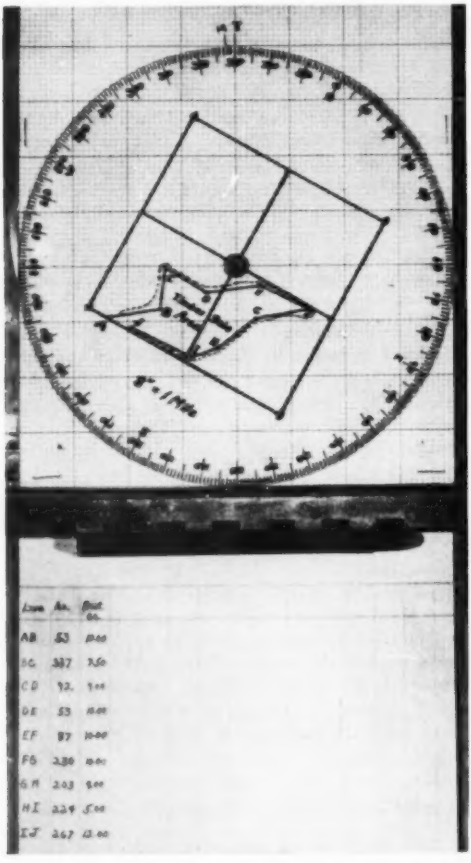


FIG. 1.—Mapping device assembled and mounted in a letter-size tatum holder.

Figure 1 shows the device being used to traverse the boundaries of a timber sale area. The error of closure will be the distance between the starting point and the final point.

Checking and Re-examination

The device can be used to check existing type maps and to re-examine areas of which maps have previously been made. To prepare the disk for this purpose, the map to be checked is traced on the disk. Care must be taken to see that the map is properly oriented to the markings on the disk. In the field, a known point is selected and marked on the map, and the point to which it is desired to go is also marked. The disk is then turned until the second point lies above the first point and on the same vertical line. The reading under "T" or "M" is the azimuth to the second point and the distance may be scaled. This procedure is actually the reverse of the one described under mapping.

Triangulation

Inaccessible points and points of minor importance may be located by triangulation. This is done by taking the azimuth to the inaccessible point and plotting it on the disk. The intersection of the azimuth lines from two or more points to the inaccessible point is the location of that point.

Random Cruising

The device lends itself readily to the location of plot centers in random cruising. When centers are plotted in the office from aerial photos or otherwise, their location can be traced on the disk. The azimuth and distance to any center from any point can be obtained by using the method described under the paragraph entitled "Checking and Re-examination." This eliminates the necessity of laying out courses and distances in the office and permits the field crew to choose the easiest course around natural obstacles, such as swamps, cliffs, etc. A formula for randomizing the azimuth and distance to each plot in the field could easily be worked out.

Uses and Modifications by Others

The field mapping device has been in use for the past three years in the Lake States. The ingenuity of the men using it has resulted in many advantageous refinements, but the basic principle of operation and application has remained essentially the same as described here.

William Sylvester[2] has installed a sliding rule that remains parallel to the vertical lines on the cross section paper, but slides laterally. This permits him to map on paper attached to the disk and eliminates the necessity for tracing.

Howard L. Brown[3] who used the map board in ranger district administration, makes the following comment, "We use it to cruise timber, survey planting areas, tie down details on K.V.[4] areas, map proposed camp grounds, check improvement layout maps, traverse logging roads, etc. You can train inexperienced men to be good mappers in a few minutes. You can check their work if they put a notebook sheet in the corner and write down shots and distances." (See Fig. 1.)

In addition to the uses listed by Brown, the device has been found useful in checking the progress of logging jobs by traversing the haul roads and skidways.

The map obtained through the use of this mapping board will be as accurate as the surveying instruments used, and the care with which the disk was calibrated.

CARL F. ARBOGAST,
Lake States Forest Experiment Station, Rhinelander, Wis.

[2]Forester with Trees for Tomorrow, Inc. Merrill, Wis.
[3]Forest ranger, U. S. Forest Service, Deer River, Minn.
[4]Knutson-Vandenberg Act.

Rodents as a Factor in Direct Seeding on Spoil Banks in Central Pennsylvania

Direct seeding as a means of reforesting spoil banks produced by open-pit mining for coal offers an important supplement to tree planting. Not only may the seeding be done in seasons when tree planting is out of the question; but also the root systems, particularly of tap-rooted species, should be superior to those from nursery seedlings. However, most direct seedings to date have been reported as failures. The important feature of these attempts lies not in the fact that failures have been common, but in the causes of failure; for it is through an understanding of the nature of these causes that success may be intelligently planned in the future. Failures to date have been generally ascribed to poor germination or adverse site conditions without mention of seed destruction by animal life. However, in the direct seedings reported in this note, it appears that the rodent factor, alone, has been the cause of failure and it is suspected the same may be true for many other cases when the factors making for poor germination are studied closely.

At first glance, it would seem that rodents would shun the bare spoil piles. But when loose shale is present, such piles offer numerous crevices and dens for small mice so that the habitat may be more heavily used than has been suspected. Three attempts were made in the fall of 1948 in central Pennsylvania where shale and sandstone bank types predominate[1] to seed spoil banks with red oak acorns. Seedspots were prepared 6 feet x 12 feet apart and 2 acorns planted per spot. On a part of the areas each spot was covered with a mulch of sawdust; while on other portions of the areas spots were seeded without mulch. Two of the banks seeded were less than one year old and had been leveled; the third bank was 3 years old, and had been leveled just prior to seeding. As is typical in central Pennsylvania, the spoil areas were about 200-300 feet in width. At first the spots were undisturbed, but in a few days small holes were observed in the sawdust, one to two for each spot. Upon examination the seeds were found missing from such spots, and as small mammals were suspected, 15 to 30 traps were set out on each of the areas along with protection of certain spots by wire cages. In the ensuing 10 day period, 11-12 mice were trapped per bank area while the caged spots remained undisturbed. The damage occurred over the entire spoil area and mice were taken both from the interior as well as the edges of the bank areas. On spots without sawdust the damage could seldom be detected because the small holes made by mice in removing seeds were obscured by frequent rains. In fact, without sawdust the damage would have gone entirely unnoticed and the certain failure of the seedings would have been ascribed to failure of seeds to germinate or other more obvious causes.

The only species of mouse trapped in over a month on the areas under study has been the white-footed mouse (*Peromyscus leucopus noveboracensis*). This is a nocturnal rodent that is active throughout the year and ranges over an area of 150 to 300 feet in diameter.[2] It is

[1]Bramble, W. C., Glenn H. Deitschman, and W. E. Keppler. Progress report on spoil bank plantings. Spring, 1948. Penna. State Forest School Res. Paper No. 11. 1948.

common in certain woodlands in this section.

The problem, now, is how to control the damage without excessive cost, for certainly rodent control has proven to be a necessary prerequisite to successful fall seeding on spoil banks in this area. Trapping, protection by wire cages, poisoning, and repellents are being tested. Cages which appear to be the surest way of protecting seedspots cost about 20 cents each and so have proven too expensive as a practical measure.

WILLIAM C. BRAMBLE and WARD M. SHARP, *The Pennsylvania State College and the Pennsylvania Cooperative Wildlife Research Unit, respectively.*

[1]Burt, W. H. Territorial behavior and population of some small mammals in southern Michigan. U. Mich. Museum of Zoology. Misc. Pub. No. 45. 1940.

Abstract of Thesis

Preliminary Plan For Wildlife Management on Baxter State Park. By Harold Jacobsen Dyer, University of Maine. 1948.

The rapid expansion and development of Baxter State Park in the Katahdin region of northern Maine to preserve a wilderness tract for the enjoyment of the people of Maine made it imperative that information be assembled for recreational planning. The abundance of wildlife, particularly moose, deer, bear, and beaver in their natural habitats, form one of the many attractive features of the area. The park generally coincides with the Katahdin Wildlife Sanctuary—141,397 acres of mountainous terrain which rises from a comparatively flat and extensive area of forest land. The region is distinguished by the severity of its winters.

The general abundance and forest type preferences of wildlife were determined by surveys during the critical winter months with particular emphasis on the game species and the furbearers. Winter food conditions of moose and deer yards were evaluated and observations were made on the habits of marten and fisher. The upper portions of Mount Katahdin were examined to evaluate the winter and summer conditions of the former habitat of woodland caribou. Observations were made during the summer months on moose and deer range as well as on bear, woodcock, and waterfowl habitat.

Three general forest types occur on the area: (1) the extensive burn type common to the easterly half of the park, (2) the coniferous forests heavily cutover since 1900, and (3) the virgin growth at higher elevations. The oldgrowth, mixed woods and softwoods were the most productive forest types while the recent cut-over stands were least suitable for wildlife. The extensive burn type was lacking in suitable browse for moose and deer, but was utilized extensively by beaver. Moose were most common in the oldgrowth types where balsam fir, mountain maple, and mountain ash provided ample food. White-tailed deer showed a preference for the oldgrowth types where northern white cedar, balsam fir, and mountain maple were utilized extensively. Marten were concentrated in the oldgrowth types on the higher mountain slopes, and fisher were most common along the watercourses. The summer habitat of moose and deer was extensive throughout, generally being in the vicinity of water. The limited area of water and suitable marsh restricted extensive muskrat and waterfowl habitat. Ruffed grouse were well established throughout the area, and a few spruce grouse were also observed. Woodcock were most common in the burn type. It is believed that potential caribou habitat exists on Mount Katahdin.

The policy of the park is to preserve and perpetuate all species of wildlife common to the northern Maine wilderness. Management recommendations were formulated which in the writer's opinion were most essential to fully develop the wildlife resources of the area.

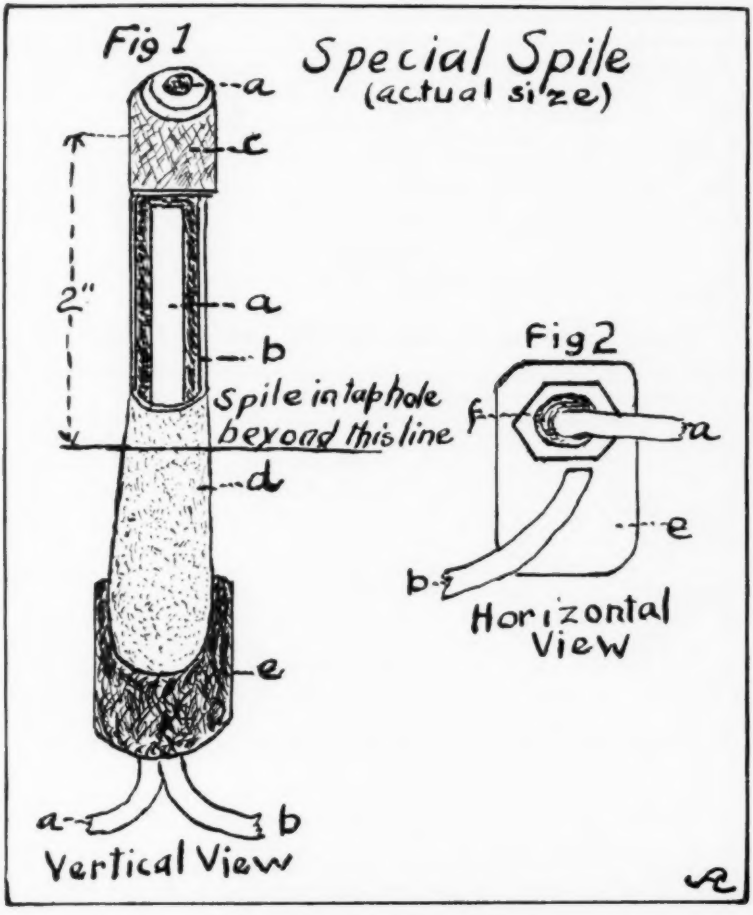
Depth of Tapping in Relation to Yield of Maple Sap

As long ago as 1895 research workers at the New Hampshire Agricultural Experiment Station reported greater yields of sap from deep tapping as compared with shallow tapping. Their findings were based on holes bored in different trees, though of approximately the same size and crown area. In the period 1940-45 several maple sirup producers in New York State, at the writer's suggestion, carried on comparable tests and measurements. For an entire season sap collected from both a two inch and a four inch tap hole was measured and recorded. Where one-bucket trees were used the operators were careful to select trees of the same diameter and approximately the same crown area. The holes were also made on the same side of the tree.

Where two bucket trees were used, instructions called for boring the north and south hole, for example, two and four inches deep respectively, and on the companion tree to reverse the depth of boring.

In these New York experiments the results coincided with the New Hampshire findings. Deep tapping gave yields from 20-30 percent greater than shallow tapping. In such experiments there is always the valid criticism that results from different trees are being compared. Any one who has studied maple sap flow is aware that wide differences in total sap yield from trees of the same diameter and crown area are quite possible. It would be necessary, to prove the validity of deep tapping to devise a piece of equipment that would actually separate the outer two inches from the inner two inches of a four inch tap hole and collect separately the sap from the two compartments.

To Zura Smith of Cattaraugus County, N. Y., a maple sirup producer with the inventive genius of an Eli Whitney goes the credit of successfully designing such a piece of equipment. It is shown in the accompanying sketch. The main feature is a tube within a tube. Tube (a) drains the inner two inches and the sap in the outer two inches collects in the channel (b)



FIGS. 1 and 2.—Deep tapping equipment.

around tube (a) and comes out tube (b). (E) is simply the flat plate to hold the tubes in place outside the tree. The hollow shell (d) conducts the sap in the outer two inches into tube (b) and thence into bucket hung on a nail. Similarly a bucket is hung under tube (a). Each tube is about 6″ long and since they extend outward in opposite directions as indicated in Figure 2, the two buckets can be hung side by side without interference. The important and really clever feature of this spile is the manner of preventing any sap originating in the back two inches from getting into channel (b). In actual practice the standard 7/16″ bit is used to bore a 4″ hold slanting slightly upward to provide good drainage. The spile is then inserted and tapped lightly in place to provide a tight fit at the bark line indicated in the sketch (Fig. 1). C is a rubber washer ½ inch in length. After the spile is in place, the hexagonal nut (f) which is threaded on to welded metal surrounding tube (a) and works against the plate (e) is tightened with a wrench. This draws the flanged end of tube (a) as shown at top of Figure 1 toward the outside and causes the rubber washer to bulge until the fit is absolutely tight at the 2″ point.

During the season of 1947 Mr. Smith made daily recordings of sap yield from the two buckets. As was to be expected there was no flow in tube (a) for the first three runs. The wood that far from the bark was still frozen. At the fourth run tube (a) gave 1 quart, at the next run 3 quarts, at the next 5 quarts. It then tapered off just as it had increased. For the entire season tube (b) gave 60 quarts and tube (a) 30 quarts. In other words by stopping at two inches one-third of potential sap flow is lost. Tests on sugar concentration of sap in buckets (b) and (a) each day showed no appreciable differences. In 1948 Mr. Smith repeated this experiment on a different side of another tree. In this case the interior two inch area gave 29 percent of the total sap volume for the season.

J. A. COPE,
Cornell University.

Dense Seed Spots Produce Spindly Jack Pine Seedlings

SOWING seeds in prepared spots in the field, sometimes used when planting stock is not available or to save the cost of nursery stock, is an old method of reforestation. To compensate for heavy mortality, several seeds are sown per spot, with the result that some usually have several seedlings. Observations on a 10-year-old jack pine seeding on the Superior National Forest in northeastern Minnesota show that as the number of trees per spot increases (1) both average height and diameter of the seedlings decrease and (2) height and spindliness of the tallest seedlings per spot increases.

If the better trees on the multiple spots are to grow and develop satisfactorily indications are that a noncommercial thinning will be necessary. This will, undoubtedly, eliminate any monetary saving of seeding over planting.

In future seed-spotting it would seem better to sow more spots per acre and use much less seed per spot. Although this would increase the labor cost, it would save on seed and might obviate the need for a noncommercial thinning

E. I. ROE,
Lake States Forest Experiment Station.

Points of View

National Park Service Foresters Protest Portions of Article

We three undersigned Members of the Society of American Foresters protest against the action of the editor-in-chief, in passing for publication in the JOURNAL OF FORESTRY many incorrect and misleading statements concerning the Bar Harbor fire, hereinafter referred to as the Mount Desert Island Fire. These statements are contained in H. H. Chapman's article "Local Autonomy Versus Forest Fire Damage in New England," in the February 1949 issue, page 103. This is written also to record more correctly certain events and circumstances which, through error, distortion, or omission of fact, are misrepresented by Chapman.

Our knowledge of this fire is for the most part first-hand because, as foresters employed by the National Park Service we took an active part in suppression action on it in supervisory capacities for 16, 17, and 19 days, respectively. For two of us service began on October 22, 1947, the day before the blow-up, and on October 25 for the other.

Chapman's incorrect or improper statements are taken up individually below in the same order as they appear on page 103, with our exceptions to them.

Statement 1

"By contrast, it is established that the Bar Harbor fire had been burning for several days, under the jurisdiction of a town fire warden, whose crews had failed to mop it up, before it broke out of control on October 21, and on October 24 surrounded Bar Harbor."

Exception 1a. The misinformation contained in that sentence is not "established" as fact.

Exception 1b. In the stage of the fire referred to, it had been under mop-up and patrol action from early morning of October 18 to the time it broke out of control on October 21. The fire had not been declared out nor had the fire boss ordered it abandoned.

Exception 1c. Suppression action was then under the direction of David A. Sleeper, fire chief, Bar Harbor Fire Department.

Exception 1d. In Chief Sleeper's and his Lieutenant Heath's own words, the fire broke out of control in the following manner:

". . . . . At midnight on Monday the pump was shut down but the lines were kept intact around the entire burn and with the exception of one or two hot spots in the center of the bog, deep in the peat, all was quiet. These were in an area that had been burned over and not considered dangerous. It is significant that these spots never did cause further damage. The total area burned over was approximately 100 acres.

"At dawn, Tuesday morning, October 21st, a brisk wind sprang up from the northwest and the chief, with day crew, was patrolling at that time. They found the situation the same as it was the night before except that the wind was whipping up considerable smoke from the hot spots in the center of the bog and the pump was started. Action was taken by hose lines to reduce activity in these hot spots. Other men were patrolling the entire area of the burn and during this patrol, one of them reported a spot fire that had sprung up about two hundred feet from the edge of the burn on the southwest corner. This spot fire, which was to lead directly to our disaster, is the source of a great deal of contention, many feeling that it was the start of a separate fire from that just described. Certainly it started a considerable distance away from the edge of the burn which [nearest to where] it started. There are several instances during our entire catastrophe when incendiarism could be suspected but nothing can be proved. The chief went immediately to the spot, discovered a fire about one hundred feet in diameter spreading with terrifying force with the wind, in the extraordinarily dry conditions, through a thick growth of spruce and pine. He saw instantly the seriousness of the situation and ordered all available lines relaid to head off the fire which was rushing ahead at an alarming rate. He then went to the nearest telephone and called aid from all the fire departments on the island and Dow Field in Bangor."

Exception 1e. During the late afternoon of October 23, the fire entered the village of Bar Harbor from the northwest following a sudden shift of the wind from southwest to northwest and an increase in wind velocity to gale proportions, reported to have been as high as 45 miles per hour at times. The fire spread through the northwest and western outskirts of the village on that date, not on October 24.

Exception 1f. Bar Harbor was not "surrounded" by fire at any time, nor could it have been, because the waters of the Atlantic in Frenchman Bay bound the village on the north and east.

Statement 2

"On October 22 the university offered the aid of its organized student force to the superintendent of the Acadia National Park, who referred this matter to the Bar Harbor fire chief, on the ground that the fire was not on national park

land, hence the Park Service had no responsibility."

Exception 2a. We assume this refers to a telephone call from Prof. Ashman of the University of Maine Forestry School to Superintendent Hadley of Acadia National Park. Ashman asked Hadley about the fire and said he was concerned about a situation then existing at the university arising from the desire of many students to go to Bar Harbor and be in on the fire activity and attendant excitement. He advised that many students had left for the fire without permission and that many others were asking permission to go. Ashman asked if Hadley considered it advisable to grant such requests.

Hadley told Ashman that sufficient manpower was then available but that more trained overhead was needed. (Assistance from the AAF at Dow Field had begun on October 21 when approximately 200 men arrived on the fire. On October 22 there were 86 fire fighters and 5 overhead on the park sector of the fire alone.) Hadley advised Ashman to hold the boys at the university and recommended that they be organized under competent leadership for later dispatch to the fire if called for.

Ashman agreed on the advisability of this course, adding that the men best qualified to lead were then on fire duty with student groups at Cherryfield and elsewhere. (See Chapman's preceding paragraph.) He said he would organize some groups accordingly and have them ready on call.

The telephone conversation, therefore, was to the effect that the university was concerned, and properly so, about whether to allow students to go to the fire as individuals, without organization and leadership; that the university's "organized student force" was then engaged elsewhere; that Hadley had sufficient fire fighters but not enough supervision; and that the university would organize some students and be ready to send them if called for.

Exception 2b. Hadley did not "refer this matter" to the Bar Harbor fire chief.

Exception 2c. The fire was already on national park land and had been since the afternoon of October 21.

Exception 2d. Hadley had fully recognized the responsibility of the National Park Service and duly acted to fulfill it early in the morning on October 21 when the fire danger, fuel type, velocity and direction of the wind were such that the fire would get into the park if not soon checked. He sent aid at once in the form of every park employee capable of fighting fire and all of the park's forest fire fighting equipment. Moreover, except for October 20, when their services had been released by Chief Sleeper, park forces and equipment had been actively engaged on the fire in close cooperation with the town fire department beginning 1 hr. and 40 min. after the fire was first reported on the afternoon of October 17 (when the fire was 1¾ miles from the nearest park boundary) and from then on until the fire was pronounced out, on the afternoon of November 14.

Statement 3

"This action, exactly comparable with that of a local town, cost the Park Service $269,000 in park property and materials, i.e., $8,000 in fire fighting costs, $95,000 for reconstruction, and $94,000 to clean up the hazard without counting damage to park value in trees destroyed on an area of 10,240 acres."

Exception 3a. The action taken by Hadley was explained in Exceptions 2a and 2b. That action is not comparable with that which Chapman accuses the local towns of taking.

Exception 3b. Not one figure in the statement is correct as final or complete data, and the cost figures contradict themselves. (The sum of $8,000, $95,000, and $94,000 does not equal $269,000.) A news release which might have provided the basis for these figures was issued by the National Park Service under dateline of Monday, November 24, 1947. As given to the press, part of the release that contains some of the above figures reads, "The National Park Service estimated it cost approximately $80,000 to fight it and repairs and reconstruction will require an estimated expenditure of $95,000; and $94,000 more is needed for cleanup, fire hazard reduction and reforestation." The release thus presented the figures as an admittedly approximate estimate of fire fighting costs and estimated needs for rehabilitation. Chapman presents them as though they are the facts on the actual costs, and the figure of $8,000 is apparently a misquotation of $80,000.

What the release expressly gives as an approximation of the area burned within the park ("approximately 16 square miles") seems to be the basis for Chapman's factually stated acreage figure of 10,240 acres. The area burned within the park was definitely established as 8,750 acres, on December 3, 1947, reductions

having been duly made for several bodies of water and unburned "islands" included within the burned area.

More up-to-date and more accurate figures than those used by Chapman could have been obtained from the National Park Service if he had requested them. They were likewise available to the editor-in-chief. The information is still available from that source if it is desired.

Statement 4

"The fire had to cross a wide belt of park land to reach Bar Harbor."

Exception 4a. How wide is "a wide belt" of land on a Class 5 fire danger day with a gale up to 45 m.p.h. driving before it a holocaust in dense coniferous stands with a two to three mile front? The Mount Desert Island fire spread from about 4,000 acres at 4 p.m. on October 23 to over 16,000 acres by midnight on the same date—some 12,000 acres in eight hours! In entering Bar Harbor from the northwest, it swept through a strip of park land which varies from one-half to one mile in width.

Statement 5

"The Bar Harbor fire chief did not take the trouble to reply to this offer until the damage was done."

Exception 5a. As previously shown, no offer of immediately available organized student assistance had been received by Hadley and consequently he could not refer such an offer to Chief Sleeper. As the latter, in turn, could not act upon an offer he did not receive, the accusation is false and absurd.

Statement 6

"Then a hurry call was sent on October 24, and the trained crews went into action."

Exception 6a. The implication is that Chief Sleeper called the university for assistance on October 24. Neither he nor Hadley called the university on that date. If such a call was sent, someone not connected with Bar Harbor Fire Department or the park sent it.

Statement 7

"The effectiveness of their work is best measured by the resolutions passed by the town officials and sent to President Hauck of the University. . ."

Exception 7a. High praise and sincere appreciation from all concerned were most assuredly earned by all University of Maine students (those that came organized and those that came unorganized) and by the faculty members for their effective and great assistance on the fire. However, by confining the commendatory references to the trained university crews (and to the Forest Service overhead in a later statement), Chapman gives the impression that they only, or they above all others, deserve the credit for the successful suppression of the fire. A broader, truer, and a more understanding perspective is needed if due credit is to be given to all who justly deserve it.

Consider the tremendous participation of the AAF from Dow Field—*25,056 man-hours from October 21 to November 6*, in addition to the provision of telephone and radio communication service on the fire, mess service, transportation service, loan of equipment and other assistance, all having an aggregate value of $110,465 and provided without reimbursement! Then there were the essential parts played by the Town of Bar Harbor and Town of Mount Desert Fire Departments, cooperating fire departments and local residents; the U. S. Navy's and U. S. Coast Guard's invaluable assistance, particularly on pumping operations; the liberal quantities of food, clothing and other services furnished to fire fighters by the American Red Cross; the diligent work of the Bangor Theological Seminary students; and the enormous contributions in equipment from the War Assets Administration. Most certainly the appraisal would be incomplete without appropriate recognition of the competent and esteemed assistance rendered by the Forest Service personnel, and the praiseworthy work of the men from Maine University. The facts and figures which reveal the extensive and capable participation of the National Park Service speak for themselves and are not confidential.

The significant fact is that not one or two agencies alone or predominantly were responsible for the suppression of the fire but no less than eight different ones, all of which were actively engaged to a major extent at the scene of the fire. It was by the coordinated and cooperative action of all of them that the fire was put out. That action was initiated, organized and directed throughout by the close liaison and working together of the two agencies primarily concerned —a town and a federal agency.

Statement 8

"It is not generally known, also, that the U. S. Forest Service sent in ten experienced fire personnel by air from points as far away as Colorado and Georgia, who were of great aid in organizing the fight which prevented further spread of the flames."

Exception 8a. In the same news release as previously referred to, the National Park Service made the following public acknowledgments: "The University of Maine and Bangor Theological Seminary permitted upper-class students to volunteer for duty under faculty supervision. . . and 10 experienced forest officers from the Southern Region of the Forest Service, were added to this nucleus of skilled supervisors of the fire fighting crews, and were flown to the fire by the Army Air Forces."

Exception 8b. No Forest Service officer was sent in from Colorado. An eleventh Forest Service man, from Forest Service Region 6, Portland, Oregon, who was on annual leave in the east at the time, was recruited for supervisory service on the fire when he came to the scene on his own initiative, time, and expense. The loan of the Forest Service overhead was provided in response to the National Park Service's request to the Forest Service in Washington. The Forest Service would have provided assistance from nearer at hand than Region 8 if its available overhead personnel in Region 7 had not been engaged or needed on other fires in the northeast at the same time.

Statement 9

"These men did not seek, and did not receive, any public acknowledgment of their services."

Exception 9a. See Exception 8a. Moreover, on November 28, 1947 the director, National Park Service, wrote to the chief forester, U. S. Forest Service, and expressed hearty thanks and deep appreciation for the splendid services rendered by all the Forest Service men who assisted on the fire, and for the excellent cooperation between the two Services. Shortly after the fire also, the regional director of National Park Service Region One sent to the regional forester of Forest Service Region 8, and individually to each of the 11 Forest Service men, an acknowledgment and expression of gratitude for their fine assistance. File copies of these letters are public documents.

Statement 10

"The National Park Service also sent 25 key men, too late to protect their own property."

Exception 10a. The *28*, not 25, National Park Service men detailed to the fire (foresters, park superintendents, park rangers, maintenancemen and laborers), reached the fire as follows:

October 22—2 men (one day before the blow-up).
October 23—5 men (the day of the blow-up).
October 24—2 men (one day after the blow-up).
October 25—19 men (two days after the blow-up).

Nine of the Forest Service men arrived on October 25; one on the 26th, and the recruit on the 29th.

Statement 11

"How much of the destruction occurring along the western beaches south of Portland is attributable to the same basic source could well be ascertained by factual investigation."

Exception 11a. Can it possibly be that Chapman is commending to JOURNAL readers "factual investigation" of the kind on which he has based the four paragraphs referring to the Mount Desert Island Fire? In our opinion, those paragraphs are unfit for publication in the JOURNAL, let alone to be regarded as exemplary of the results of professional fact-finding investigation.

Summary

From the overall standpoint the following aspects of the subject portion of Chapman's article are, to us, particularly offensive and objectionable:

1. The publication of it in the JOURNAL OF FORESTRY.

2. The false, insidious, and absurd charges or implications which reflect unjustly upon foresters of the National Park Service who are responsible for directing fire control activities in that Service.

3. False denial of one of the most outstanding and essential conditions on the fire—the fact of coordinated and cooperative action by local towns with an unusually large number of diverse and remotely based groups, some of which had never before participated alone or with any of the others in a similar fire emergency. (To have recognized or admitted this would have prevented the writer from attempting to

use the Mount Desert Island Fire case to suit his purpose.)

4. The unjustified and inept attempt to add proof in a case against local autonomy by dragging a federal agency into the argument.

5. The petty emphasis upon whether or not public acknowledgment was made for services rendered on this major fire catastrophe, especially with reference to foresters and student foresters.

We believe that Superintendent Hadley, Chief Sleeper, and foresters in the National Park Service have been dealt with unjustly and that they have been done a great disservice by the publication in the JOURNAL OF FORESTRY of those paragraphs of Chapman's article to which we have objected.

FRED H. ARNOLD.
WILBUR L. SAVAGE.
ROBERT B. MOORE.

"Forest Management As a Business"

The editorial in the March issue on "Forest Management as a Business" was timely and very well handled. Our goal is forest properties which will pay their way year after year and be recognized as a safe form of investment. Management, however, must follow better utilization. Until there is a fairly good market for all the forest products an owner should be taking out, especially the low-grade wood from improvement cuttings, management plans do not mean much. All he can do is to sell from time to time something for which there happens to be a demand. We have faced that in Connwood. The New England Forestry Foundation and the preparation of farm management plans at Harvard have been meeting the same difficulty.

The State of Washington has set up a Forest Products Commission which is making a survey of the wood material now left in the woods or accumulated by wood-using plants, and exploring methods by which it can be put to use. Their long range plan is based on the premise "that the one-product mill which recovers and sells less than half the footage of the timber in its woods is slowly yielding place to the correlated manufacture of many products and the utilization of everything down to the bark." For New England, we have at least made a start in a three-months field survey of the larger sawmills and wood-working plants, financed by a grant from the Federal Reserve Bank of Boston, to locate the concentrations of manufacturing waste which might justfy local utilization plants. This will be followed next fall by a conference on wallboard from waste.

In the March issue of the *Timberman*, there is an interesting article by Phimister B. Proctor and William J. Baker on "Definition of Wood Waste." With the advance in wood products research, our Council has come to define waste as "unutilized wood material." To the chemist, the wood that is discarded is no different from the wood that is used. The engineer looks on all wood substance as a form of organic matter with potential value. To retain the term "waste," with its commonly accepted note of condemnation, keeps us all asking why the material is not utilized, and trying to overcome the technological and economic factors that are preventing utilization.

EDGAR L. HEERMANCE,
Northeastern Wood Utilization Council.

Reviews

Forest and National Prosperity, A Reappraisal of the Forest Situation in the United States. Misc. Pub. No. 668, Forest Service, U. S. Dept. Agric. 99 pp. Illus. Supt. of Documents, Washington 25, D. C. 1948. 40 cents.

In this publication the Forest Service reports upon its reappraisal of the forest situation in the United States, made during 1945 and 1946. This job supplements and brings up to date the figures and information assembled by previous studies, latest of which was previously reported in "A Forest Program for the United States," popularly referred to as the J.C.C. report. The current publication will probably come to be known informally as the Reappraisal Report.

The Forest Service evidently undertook this study on its own initiative rather than as the result of a congressional request as was the case with the J.C.C. report. Apparently the Service just thought it would be a good idea because it is not addressed to anybody in particular. Nevertheless, the Service obviously hopes that the report will lead to new federal forestry legislation. Some specific recommendations are spelled out plainly and Mr. Watts says, in his foreword, "It is my hope that publication of this report will help spur the nation to prompt, forceful, and comprehensive action to build up and maintain the forest resources so as to insure their maximum contribution to lasting prosperity for our country." The emphasis is on timber and wood growing though other forest values, such as watershed protection, recreation, and grazing, are discussed.

In the text the Forest Service restates its national forest policy position and makes it plain that it believes desirable ends will be best served if Uncle Sam prods harder with his pitchfork with the three tines—cooperation, regulation, and expanded public ownership.

Participation in the program by the states is given a good play after pointing out that, though 75 percent of the commercial forest land is privately owned and much is expected to stay that way, "private owners cannot reasonably be expected to do alone a job for which they are as yet unprepared and unequipped."

The first 12 pages are devoted to an all-text summary. The preamble of this section points up the forestry lessons learned as a result of World War II, estimates that the U. S. probably consumes as much wood as all the rest of the world combined, and mentions the extent of community and rural-area dependence upon forest-based enterprises. It says that a prosperous, well-integrated economy implies productive forests capable of supplying a greater timber cut than heretofore visualized, and on a sustained basis. The world is short of softwood timber and it is in the national interest to build up America's forests so as to contribute in the long run to world timber trade. Full-measure use of the products and services of the nation's forests are part of an obligation to gain a stable, prosperous economy and hence a better hope for world security.

The Forest Service then states the case with 18 points and spells out its program with 13 separate specifications. Ten of the latter relate to cooperation, one to regulation, and two to national forest expansion and intensified management.

The case is based on such premises as these: the nation has plenty of forest land; the sawtimber supply is steadily shrinking; our sawtimber cut exceeds growth by 53 percent and quality is deteriorating; the nation cannot rely on increased imports; and timber cutting practices on private lands are largely far from satisfactory. The job is complicated by its size and toughness and no hope is expressed that it will be licked "in a minute or two." American forestry has made great strides, but little more than a beginning has been made toward achieving a sound, permanent forest economy. Better protection and more efficient wood use are essential goals.

The proposal for stepped-up cooperation includes details such as expansion and strengthening the Norris-Doxey type of technical assistance and its expansion to include small owners other than farmers, strengthened educational and demonstrational work, greatly accelerated planting on private forest land, federally sponsored forest credit and forest insurance systems, extension and intensification of cooperative protection against fire, insects, and diseases, and others.

Public control of cutting and other forest practices on private forest lands have what this reviewer believes to be a new wrinkle—at least he has not known about it before. This is a sort

of "Clarke-McNary" financial cooperation with the states to help them get regulation ("public control of cutting *and other forest practices on* private forest lands" is too long) started. Otherwise it looks about the same as when we saw it last.

The subsequent 87 pages present the full detail, well documented with statistical tables and charts. Main topics are forest land and its uses; the timber resource; our use of the timber resource; goals for timber growth; the problem of meeting timber needs; how timberlands are being managed; forest industries based on timber; wood waste; nontimber uses and services of forests; forests need better protection; and how forest ownership affects the outlook.

A few of the outstanding conclusions deserve mention. The forest growing stock is below par in quantity, quality, and distribution. Thirty-five percent is deforested or less than 40 percent stocked. The country should aim at growing from 18 to 20 billion cubic feet of timber, including from 65 to 72 billion board feet of sawtimber annually. Present growth is set at 13.4 billion cubic feet, including 35.3 billion feet of sawtimber. Although private forests carry a heavy responsibility, the keystone of American conservation policy is permanent public ownership and management of a substantial part of the forest land. Private ownership is widely divided. Larger owners have some advantages and small owners are the heart of the problem. Small private owners must be given public encouragement and help and public control must be applied to cutting on all private properties. Adverse economic factors affecting private forestry include lack of satisfactory sources of credit and insurance. Property taxes have long been considered a major obstacle to private forestry but their deterrent effect has generally been exaggerated, the report says. Property taxes are likely to influence the management of less than half the private land and probably appreciably affect only a fraction.

The key issues, as stated, are how to achieve good forestry under private ownership; how to protect the public interest in forests not readily susceptible of good management under private ownership; and how to equip public forests so that they may contribute more.

This publication and the series of progress reports preceding it are sources of information and statistics reference indispensable to many foresters. Whether or not you agree with all the interpretations and conclusions, you will want to have copies of the full series in your library, particularly if you are concerned with economic or policy matters relating to forestry.

H. B. SHEPARD,
Federal Reserve Bank of Boston.

❦ ❦ ❦

Silvicultural Management of Black Spruce in Minnesota. By Russell K. LeBarron. U. S. Dept. Agric. Circular No. 791. 60 pp., Illus. 1948. Superintendent of Documents, Washington 25, D. C. 15 cents.

The proper silvicultural treatment of black spruce has probably been the cause of more arguments among foresters in Minnesota than any other topic. Although this publication may not settle all the controversial points, it does provide a wealth of information on the subject and answers many of the questions of greatest concern to foresters in this region.

Here, for the first time, all the pertinent information available on the use, area and volume, growing and seeding characteristics, and growth and yield possibilities of black spruce has been gathered together in one booklet. Combined with this is information on the results of numerous studies made by the author of various types of silvicultural operations, cutting and regeneration. One very important controversial point which this publication should settle is that many stands of black spruce are adaptable to partial cutting. In spite of its shallow root system, the author has demonstrated in convincing experiments that light partial cuts in black spruce are practical and the resulting increase in yield well worthwhile.

In 1946 and 1947 nearly 240,000 cords of spruce were cut each year in Minnesota and for the three Lake States approximately 400,000 cords were harvested annually. At current prices the value of the Minnesota production of spruce at the mill was over five million dollars in both 1946 and 1947, and this value is considerably greater than any other species of wood cut within the state. During these same years, spruce was cut about twice as fast as it is being replaced by growth.

This fact should be sufficient evidence to indicate the timeliness and significance of this publication, particularly so as the author found that, through light periodic cutting, spruce stands can be made to yield between one-third

and one-half more wood than in stands where no partial cuts are made.

This publication should be of wide interest to foresters throughout the growing range of black spruce. It should be of particular interest in the Lake States region where one of the major problems is to find ways and means of extending the present supply of this very valuable tree.

GEORGE B. AMIDON,
Minnesota and Ontario Paper Company.

Soil Conservation, and International Study. FAO Agricultural Studies No. 4, Food and Agriculture Organization of the United Nations. 189 pp. Illus. Washington. 1948. $2.

Every so often a book appears that stands as a milestone in social progress. Such a book is *Soil Conservation, an International Study.* It should and doubtless will receive widespread attention.

In a way it is a textbook of world conservation. We have had publications on local, regional, and national conservation. Now, for the first time, an entire book is devoted to soil conservation on a world level. The various chapters draw upon previously published information in setting forth the physical and economic factors in the use of the world's soil; the erosion situation in various countries; methods of conservation that have been adapted in different places; and the political means being used to organize conservation practices into national programs. This world picture is presented concisely and attractively, the language is highly readable, illustrations are numerous and exceptionally well chosen, and above all, a precise balance has been achieved between broad generalities and technical details. As a textbook alone, the publication is commendable.

But the book has another and greater value. It is a philosophical guide to dynamic human action. And in this respect, the book is monumental. For here is a thesis that can be used by the policy-makers of the world's governments for the welfare of all the people. It is presented in the course of a single-paragraph foreword and a three-page introduction. In a sense, all that follows thereafter is factual support for the persuasive thesis given initially. Boiled down to its essentials, the philosophy of the book is embodied in these three statements:

1. "This study sets forth the proposition that the care of land is a prerequisite to survival."

2. "The great historical lesson of soil and water conservation is very simple: the lands of any nation or region are an indivisible unity."

3. "A nation cannot conserve its true cropland soils and ignore its mountains and forests . . . Methods and techniques vary from farm to forest to range. But care must be given to each."

These are not empty generalities. They are axioms to guide realistic action by nations, as attested by the proposal before our own government at this very moment to coordinate the farm, forest, and range land services under a single administration. It is a philosophy that should be integrated into the thinking of all who are responsible for the development and execution of land programs.

HENRY HOPP,
Soil Conservation Service.

Rainfall and Runoff. By Edgar E. Foster. 487 pp., Illus. Macmillan Company, New York. 1948. $9.

This new text on the complex science of hydrology will make a valuable reference for engineers, foresters, and others who are interested in water as it falls on and runs off of the land. It is intended specially for use by the younger hydrologists, and therefore goes into details in developing hydrologic and statistical concepts which might not be entirely necessary to workers of longer experience. Also, as suggested by the title, the book deals with the physical rather than the biological aspects of water relations. But within this general framework it presents a very well-rounded picture of current knowledge in hydrology.

The first chapter discusses this subject in broad terms, indicating the importance of hydrologic problems and the scope of the topics to be covered. Then the author logically passes on to several chapters which deal with moisture in the air and its precipitation onto the ground surface. These close with a detailed discourse on snow and its measurement, including some data on forecasting runoff from snow records. Then, after a review of the general subject of evaporation losses, the book is completed by means of thorough discussions of runoff, floods, and groundwater. As a summary, the last chapter covers a number of uses which are made of hydrologic data.

Writing this large and thorough text must have been a herculean task, and every chapter shows evidences of the most careful and painstaking thought and study of available knowledge. Hydrology is a hard subject to write about because it is developing so rapidly as an important and complicated branch of science. For this reason other workers in hydrology may make some criticisms of this text, though without implying any reflections on its general quality and usefulness. A few examples may be worth mention here. For one thing, the author devotes an unusually large amount of attention to the use of statistical methods in hydrologic analyses. In itself this is very desirable, as these methods have been rather largely overlooked up to now. It might have been better, however, to have spent less space on the elementary aspects of statistics, referring the reader instead to one of the excellent texts on the subject. The same space might have been used more profitably in presenting the special adaptations of statistics to hydrology and showing their limitations. In discussing the use of regressions in forecasting, for instance, he might have given some attention to the associated errors, and their estimation by statistical methods.

Even though the text is purposely concentrated on the physical side of hydrology, foresters will probably feel that more mention should have been made of the really important effects of vegetation in hydrology: on surface and subsurface runoff, infiltration, water storage, evaporation, and transpiration.

As one more illustration, workers on flood-control surveys have suggested that a section on the estimation of average annual flood damages would have been a desirable sequel to the discussion of flood frequencies. This would have highlighted the interesting fact that a major part of flood damages may be contributed by floods of low magnitude but high frequency, rather than by the more spectacular but infrequent "maximum" floods.

But no text can satisfy everyone, especially on a subject like hydrology. With its analysis of many accepted hydrologic methods, descriptions of numerous procedures and kinds of instrument, and compilations of available data on a variety of hydrologic subjects, this book will prove instructive to students and useful as a reference work for the experts. Mr. Foster is to be highly congratulated.

H. G. WILM.

Newsprint Paper in North America. By Royal S. Kellogg. 92 pp. plus charts. Newsprint Service Bureau, Inc., New York, N. Y. 1948. $15.

It is fortunate that Royal S. Kellogg found time to prepare a statistical and historical account of the development of newsprint in North America, starting with the year 1690. With his rare skill in making figures attractive, he has brought together in a single book information which covers the early history of newsprint on this continent, its more recent development, and present status.

He has done this in a series of very readable chapters. The detailed record goes back to the year 1890 when the capacity of newsprint mills in the United States was just beginning to reach into the upper brackets of paper production. It is interesting to read the lists of the companies at that time engaged in newsprint manufacture since so many of them have now ceased to make this product.

Kellogg continues his analysis through the year 1948 when production had so generally been diverted to the Canadian and Newfoundland mills. It is of value to every forester to understand clearly how this came about due to the pressure of economic conditions!

In his chapters on newsprint consumption, Kellogg goes back to the year 1788 and by means of a chart shows how, beginning in 1890 when wood pulp came into general use for newsprint, consumption in the United States has sky-rocketed from 6 lbs. per capita until today it averages 70 lbs. per person which is an all-time high! The average in the world is about 7 lbs. per capita.

In respect to newsprint prices, costs have also sky-rocketed so that the current price per ton delivered in New York City is $100, which is double the price prior to World War I.

The final chapters of Kellogg's book deal with woods operations as related to milling practices, and finally with the timber supply itself. The author in quoting the American forestry program agrees that it should constitute more than the production of wood, and that it should include all "human values inherent in abundant forests." No one will quarrel with this conception, which is recognized by industry as well as by government as essential to the welfare of our country.

The various charts and diagrams which illus-

trate this book exemplify the skill for which the author has long been known in setting forth statistical material. It is to be hoped that someone will do a similarly good job for the other kinds of paper produced in North America!

A. B. RECKNAGEL,
St. Regis Paper Company.

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Ročenka (*Yearbook*) *1947*. Bulletin of the Forest Research Institutes of the Czechoslovak Republic. 252 pp. Illus. Ministry of Agriculture, Praha. 95 Kcs. 1948.

This first comprehensive postwar report on forest research in Czechoslovakia is of interest for several reasons: (1) It bridges the gap brought about by World War II; (2) it informs us of a considerable amount of research accomplished under difficult circumstances; and (3) it is the first report issued since the Czechoslovak government came under control of communists.

The yearbook consists of an introduction and 15 chapters or articles. It is only in the introduction that the political propaganda characteristic of many Soviet Russian publications is found. The others adhere quite strictly to the reporting of research results. An introductory chapter gives a good condensed history of forest research in Czechoslovakia, and its present organization and future aims. Quite understandably, there has been some reorganization of forest research in this country since the war ended.

The greater part of the yearbook is made up of 14 technical articles covering such subjects as these: forest soils, seed source, plantation development, artificial pollination of trees, injuries by diseases and insects, game bird propagation, use of aerial photographs, mensuration, and forest products. These articles vary greatly in length and quality, as well as subject matter, but on the whole they are very creditable contributions.

Although this yearbook is written largely in the Czech language, each article has a summary both in English and Russian. The English summaries as a rule are quite adequate, but it is to be regretted that the tables and illustrations do not also carry captions in English. With that addition the average American forester could understand the essential facts and supporting data of each article.

PAUL O. RUDOLF,
Lake States Forest Experiment Station.

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Meddelanden fran Statens Skogsforskningsinstitut. Manfred Naslund, editor. 550 pp. Centraltryckeriet, Esselte, Stockholm. 1948.

Reports of the Forest Research Institute of Sweden, Vol. 36, is a compilation of nine separate studies. Printed in Swedish with English summaries, the individual reports cover a wide range of subjects.

Bertil Matern presents a report on "Methods of Estimating the Accuracy of Line and Sample Plots." Proceeding on the premise that random sampling is lacking when field experiments or sample surveys are systematically laid out, various formulae were examined to determine a reliable method for computing the standard error of such surveys. Results of the investigation indicate that the most suitable equations for computing standard error are based on expressions of variation between observations on fairly short, adjacent strips. A formula developed on this basis, which can be used for estimates from regularly spaced sample plots and measurement of sample trees as well as line strips, is illustrated by numerical examples in the report.

Manfred Naslund, who in 1940 developed a set of volume tables and functions for the computation of form factors in pine, spruce, and birch in northern Sweden, reports on a corresponding study for southern Sweden. Using diameter at breast height, total tree height, crown ratio and bark thickness as a percentage of d.b.h., a series of formulae have been developed by correlation analysis for determining form factors.

"Soil-Improving Measures Tried on a Poor Site" is the final report on investigations started in 1922 to determine the possibilities of raising the poor forest yield frequently found on sandy soils.

Other reports are concerned with yield tables for ash; cutting budgets for Norrland; *Laspeyresia grossana*, Haw., a pest in beech woods; site-improvement experiments in lichen-pine forests; and investigations of decay fungi in Scots pine.

JOHN FEDKIW,
N. Y. State College of Forestry.

The Earth's Green Carpet. By Louise E. Howard. Rodale Press. 1948. $3.

The main theme of this book by Lady Howard, the wife and colleague of the late Sir Albert Howard, is that chemical fertilizers are a menace to the health of the nation because they rob the crops of vital mineral substances. To overcome this deficiency, the Howards have written and preached the gospel of "green manuring," of returning to the earth its own compost. The green-manuring school, which originated in England, has made some headway in the United States—chiefly among people who run to every new fad in agriculture. There is even a magazine devoted to the fad, *Organic Farming.*

The Earth's Green Carpet is a brilliant exposition of the Howard theories, with illustrations drawn from the ends of the earth. Of interest to foresters is the chapter entitled, "The Retreat of the Forest." The forest, of course, is the perfect example of a type of land which fertilizes itself, and hence bulks large in the discussions and arguments of the Howard school of agronomists (if we can call them that). It is in the forest that we see a conglomeration of botanic forms living in ecological harmony, each serving a definite purpose and the whole being, in Lady Howard's phrase, a perfect "fertility cycle."

The destruction of the forest destroys this cycle and brings various consequences, some of which are injurious to man, and often leads to the destruction of his civilization. Lady Howard, therefore, suggests that we go easy in getting rid of our forests and that wherever possible trees should be replanted, for they are the true conservers of the energy drawn from the sun, the soil, and the rocky materials beneath.

ANTHONY NETBOY.

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The Commercial Timbers of Australia—Their Properties and Uses. By I. H. Boas. 344 pp. Illus. Pub. by Council for Scientific and Industrial Research, Melbourne. Sold by Tait Book Co. Pty. Ltd., Melbourne. 1947. 12/6.

I. T. Boas, now retired, was chief of the Division of Forest Products since its inception in 1929. His book is an epitome of the work of the Forest Products Laboratory and of previous information on native Australian species of wood. As it deals exclusively with native and planted timbers and utilization problems in Australia, its chief value will naturally be to that continent, although the general principles discussed apply universally.

Although the book was prepared largely on his own time, it was published as an official document of the Commonwealth. He received no compensation other than the prestige of having produced the first comprehensive and authoritative work on the subject in Australia. This, then, represents the tangible results of 25 years of untiring effort for promulgation of the use of native instead of imported timbers, and of research into their properties and uses. He is chiefly responsible for the establishment of the present fully equipped Forest Products Laboratory in Melbourne with its staff of 130 people. Moreover, the native wood-pulp industry, now well established, and the extensive veneer and plywood manufacture, are the result of his efforts.

It may be a surprise to many foresters to learn of the extent of the scientific study that has been given to native trees in Australia, and also of the early dates at which such work was begun. In fact, except for our early timber tests of the Tenth Census and the ambitious program by B. E. Fernow, which started in 1891 and terminated in 1896, scientific study of forest products was for a long time carried on in Australia on a more extensive scale than in this country. Early work, prior to the creation in 1928 of the Division of Forest Products in the Commonwealth Council for Scientific and Industrial Research, was done largely by the individual states at their universities.

The various studies made by the two Australian states were nevertheless somewhat desultory, without any well coordinated program, and there has been no adequate literature of authoritative form on all the features of Australian timbers as a whole. The long-felt want is at least partially supplied (for 123 species) by Boas' new book.

In Part I is discussed in a general way phases of utilization, and in Part II the properties and uses of 123 native Australian timbers are fully described. This second part contains much new information on the important commercial species.

At the end is given a bibliography of 987 references on Australian forest products. Current references are also given at the ends of chapters

in Part I. There are 20 plates of photomicrographs and photographs. The index (a most important feature of any book of reference) is fairly complete.

Some interesting facts are gleaned from Part I. In regard to pulp and paper manufacture, it will be recalled that H. E. Surface from the U. S. Laboratory was called to Hobart (Tasmania) to advise in regard to such usage, but turned in an adverse report in 1914. During my visit in 1922, experiments were being conducted by L. R. Benjamin in Perth in which he obtained some very satisfactory paper on a laboratory scale, with a yield of pulp of 50 percent, by soda process, and a semi-commercial test was carried out by the Commonwealth Institute of Science and Industries in Geelong. Printing and writing papers were made by the Australian Paper Mills from 75 percent Australian bleached soda pulp and 25 percent imported pulp. Subsequently, suitable groundwood for mixture in newsprint was produced in Tasmania at a complete pilot plant (1928). At present, three companies are making pulp from eucalyptus, producing 85,000 tons annually. The mistake made by foreign expert advisors in the early days was in assuming that a stronger soda treatment was needed in the case of eucalyptus, whereas just the opposite is the case, for it is easier to break down the lignin-cellulose complex and dissolve out the lignin in hardwoods than in softwoods. Moreover, it is not the *length* of fiber that is important, but rather the ratio of length to diameter. The present commercial success of the pulp industry was brought about by Boas after 20 years of effort against discouraging prejudice and political odds. During this period he visited all the important paper-making countries of the world.

Australia now imports only 10 to 20 percent of her pulp, whereas formerly all was imported.

Another accomplishment by the author is the commercial development of plywood manufacture. Plywood plants are now operating in every state; extensively in Queensland and New South Wales. The main species for this purpose are hoop pine, and some Queensland kauri and bunya pine. The principal available remaining supply of this splendid wood, hoop pine (*Araucaria cunninghamia*), is on the mountain ranges of New Guinea at elevations of 5,000 feet, although there are scattered clumps along the coastal ranges of Australia from southern Queensland to the northern coast. The only drawbacks are the common occurrence of compression wood and fine pin knots near the heart. At present rate of cutting of 100 million superficial feet a year, it is estimated that the present stand in Queensland will be completely out in ten years. In addition to kauri, hardwoods are used, such as Queensland maple, silky oak, Queensland walnut, myrtle beech, and mountain ash. Planted radiata pine is used in South Australia but it is difficult to obtain peeling logs free from many knots. The use of pressed pulp, and of plastics made from wood, has not advanced very far.

An extremely important feature of many Australian woods is pointed out in what is known as "brittle-heart." Wood of the inner portion of many logs is found to be brittle although showing no visible indication of rot. This feature is especially common in the eucalypts. In large trees half their diameter may be brittle-heart. This wood tends to collapse more than the outer portion. Under the microscope the fibers appear broken across. These are entirely different from the fine compression failures or cross breaks so frequently observed in American woods, especially in balsa and quipo. Brittle-heart must be strictly avoided in all structural timber and in veneer, and it yields poor pulp. The wood of logs is divided into three concentric zones termed "sapwood," "true wood," and "brittle-heart." In all strength tests the distinction between true wood and brittle-heart is very pronounced and must always be clearly differentiated. Illustrations are given of the fine cross lines of failure in a radial section as shown by polarized light, of the broken fibers in pulp, and of the pronounced difference in character of failure in an inch-square beam of each kind of wood.

This characteristic is entirely distinct from the brash failures of compression wood or rotholz. Has this feature been overlooked in our own timber? Or is it absent? We have paid no attention to the distinction between true wood and brittle-heart. Perhaps we need to study our timbers more critically with this feature in view. This discovery of brittle-heart would seem to be one of the most important recent observations made by the Australian laboratory.

In the first part of the book all of the usual utilization features are briefly discussed. Australia is little, if any, behind the U. S. as to knowledge and practice, thanks to the work of the laboratory.

Much work was done during the war on improved wood, especially for variable-density airplane propellers. A systematic study was made of many types of resins for impregnation. A water-soluble phenol-formaldehyde of molecular ratio 1 to 0.88 proved to be the best as to mechanical properties of the improved wood, as it penetrated the cell walls, instead of merely the fiber lumina. The first set of these variable-density blades was made in December 1943, out of 1/24-inch coachwood veneer. These blades are now under production by a company in Sydney.

Thirteen pages in one chapter are given to seasoning, mainly kiln drying, and schedules are given for 64 species of thicknesses from ¼ to 3 inches. High-frequency (dielectric) drying was experimented with and is briefly discussed, as also chemical seasoning. Prejudice and opposition to kiln drying were very strong, even more so than in the United States, and although some of this was overcome by my own visit in 1921-1922, it persisted for many years. Today kiln drying is accepted standard practice throughout Australia. There are now 650 kilns drying solid timber and 120 veneer dryers. Most of the lumber kilns are in small units of the internal-fan cross-shaft type designed by the Australian Laboratory.

The veneer and plywood industry was mentioned above. There are now 25 plants, with an annual output of 140 million superficial feet of 3-ply. Kauri is used extensively much as Douglas-fir is in the U. S. and it is a better wood for the purpose. Coachwood (*Ceratopetalum apetalum*) and leatherwood (*Eucryphia lucida*) are the only species that meet aircraft specifications, but hoop pine, Queensland kauri, and bunya pine form the bulk of the plywood; 28 other species are listed with their characteristics for this purpose. As in the U. S., veneer is dried in veneer dryers, in kilns, and in sheds. Glued-laminated construction differs from plywood in having no crossbanding. Also as here, casein and soya-bean glues are mainly used with some Tego film and some urea resin.

One chapter deals with preservative treatment. It is noted that satisfactory penetration of preservative cannot be obtained in the true wood of the eucalypts. Tests indicate that coal-tar creosote is superior to all other preservatives, but brush application has proved of little benefit. It is estimated that 120 million super feet (board feet) of treated sleepers will be required per annum, but a satisfactory solution to their preservative treatment has not yet been obtained.

Wood bending is extensively discussed and a list of 63 species is given, grouped from excellent to bad. The best bending woods are red tulip oak (not *Quercus*), spur mahogany, myrtle beech, southern sassafras, horizontal, and celery-top pine. Curiously, *Eucalyptus globulus* (blue gum in California) is listed as the best bending species of the entire genus and *E. sideroxylon* (red iron-bark) as very bad. Why so, is hard to understand.

Tannins are an important product, and run much higher in concentration than in any of our trees. Many yield 30 percent and some of the wattles (acacias) 38 percent. One eucalyptus (brown mallet, *E. astringens*) of western Australia yields 45 to 55 percent from the bark, the richest of any in the world. With a rotation of 35 years these trees average 60 feet tall and 56 inches girth, and yield tanbark and timber for axe handles, etc., and fence posts.

Thousands of acres have been planted to *Pinus radiata* both for timber and for oleoresin. However, the tapping yields only ½ to ¾ lb. per inch diameter per annum, as compared to 1 lb. in the southern pines in U. S. A.

Essential oils are largely obtained from eucalyptus leaves. Annual output is 230,000 gallons, 78 percent of which is exported. These oils are used 65 to 70 percent medicinally; the rest for industrial purposes, as flotation oils in mining, soap, sandalwood for perfumes, and Baronia, a very valuable perfume, quite exclusive to western Australia.

As to strength values, the timbers are placed in four groups. There are also four groups as to durability, especially as to resistance to termites. It is interesting to note that in structural material weight per cubic foot, air dry, runs from 33 lbs. for hoop pine to 70 lbs. for grey box (*E. hemiphloia*). Among the most durable woods are: cypress pine (*Callitris*); turpentine (*Syncarpia*), and such eucalypts as: red iron-bark, wandoo, grey box, grey gum, yellow gum, and tallowwood.

The Standards Association has made considerable progress in grading rules and in nomenclature, nevertheless the grading of timber in Australia is still in a very unsatisfactory status, which adversely affects the utilization of native species.

Other utilization subjects discussed are dis-

tillation (which is no longer being used), and sugar and alcohol from wood: the German Bergius process (hydrochloric acid), the Scholler-Tornseeh process (dilute sulphuric acid), and the U. S. process (diluted sulphuric acid under steam pressure). This industry is not developed in Australia for economic reasons. Charcoal was produced on a large scale during the war mainly for producer gas and automobiles, and for the iron industry in western Australia.

Identification of Australian timbers has been given much study and a mechanical key has been evolved for all species. This mechanical method treats all features noted as of equal value, and consists of a system of punched cards. All features to be noted are arranged in a series of numbered marginal holes, each being assigned to one feature, as hard, medium, soft, for example. For each known species one card is prepared and those holes corresponding to each of its characteristic features are notched through to the margin. For the specimen whose identity is unknown a similar card is prepared without notching, but only those holes punched which correspond in position to the observed features. The pack of known cards is then matched to the unknown, and needles run through each punched hole of the unknown and through the pack. If all features agree on any known card that card will drop out of the pack. Generally more than one may drop out, but it will then be a simple matter to determine to which of the two or more the unknown is likely to belong.

The advantage of this method of identification is that it is immaterial which feature is sorted out first, and one need only sort on those features which one is sure of. (My own experience is that the disadvantage of such a mechanical system is that it does not show the relative importance of any one feature over another.) The book does not contain a key nor does it give anatomical descriptions or specific distinguishing features.

HARRY D. TIEMANN.

Christmas Tree Shipments Increase in Montana

MONTANA shipped over 3.1 million Christmas trees last season, according to Northern Rocky Mountain Forest and Range Experiment Station research note 71.

The widespread Douglas-fir "blight," caused largely by a fungus, *Rhabdocline pseudotsugae*, is even more serious this year than last. Two consecutive wet springs have induced a build-up in the epidemic, in addition to forming open tips in many of the trees by the rapid growth.

Nearly ideal harvesting weather, a plentiful labor supply, and a greater confidence in recognizing blighted trees accounted for the increase in production over the previous year. Private land continues to be the major source of Christmas trees, but cutting on public land has increased to supplying a quarter of the total trees produced. Shipments were routed to 33 states and three cars were exported to Cuba. The Central States received 81 percent of the trees: Illinois took 584 carloads with Iowa, Missouri, Texas, and Kansas following in that order.

BEN M. HUEY,
Northern Rocky Mountain Forest and Range Experiment Station.

Current Literature

Compiled by MARTHA MEELIG, *Librarian*
The New York State College of Forestry

Range Management Section Compiled by
FRANCES FLICK, *Library, U. S. Department of Agriculture*

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Abstract of Master's Thesis

Is Douglas-Fir Replacing Ponderosa Pine in the Cut-Over Stands in Western Montana. By Kenneth N. Boe. School of Forestry, Montana State University. 1948.

CUT-OVER ponderosa pine stands, 7 to 51 years old, were studied in western Montana during 1947. The field study, a project of the Northern Rocky Mountain Forest and Range Experiment Station, consisted of locating and measuring sixty temporary sample plots, one-half acre in size in a range of stand conditions. Measurements taken on each plot were such that the original, reserve, and present stands could be reconstructed. Burned-over areas were not included in the study as the purpose was to sample natural regeneration following logging and slash disposal (mainly pile and burn).

Composition of the original pine stands is due to many factors: fire, disease, insects, and others affecting the stands over a long period of years. Following cutting and with partial exclusion of fire, these stands are regenerating to young stands having a higher proportion of Douglas-fir than the original mature stands. Ponderosa pine is the desired species from the standpoint of quality of lumber and yields per acre, so it is important to forest managers to know where the encroachment of Douglas-fir over pine is of sufficient magnitude to reduce pine stocking materially for future forest crops.

Results of this study are: (1) stands on northerly aspects in which original composition averaged 75 percent ponderosa pine and 25 percent Douglas-fir are regenerating following cutting to 85 percent Douglas-fir and 15 percent ponderosa pine; (2) stands largely Douglas-fir before logging and representing a tension zone between ponderosa pine type and Douglas-fir type, are regenerating almost exclusively to Douglas-fir; (3) on southerly aspects, in which original stands averaged 84 percent ponderosa pine and 16 percent Douglas-fir, composition of present young stands is 62 percent ponderosa pine and 38 percent Douglas-fir.

Society Affairs

Officers and Members of the Council—1948-1949

CLYDE S. MARTIN, *President*
Weyerhaeuser Timber Company,
P. O. Box 1645,
Tacoma 1, Wash.

CHARLES F. EVANS, *Vice-President*
U. S. Forest Service,
Glenn Building,
Atlanta 3, Ga.

HENRY CLEPPER, *Executive Secretary*
825 Mills Building,
17th Street at Pennsylvania Avenue, N. W.
Washington 6, D. C.

WILLIS M. BAKER,
Forestry Relations Division,
Tennessee Valley Authority,
Norris, Tenn.

CHARLES H. FLORY,
State Commission of Forestry,
Calhoun State Office Building,
Columbia, S. C.

RICHARD E. MCARDLE,
Forest Service,
U. S. Department of Agriculture,
Washington 25, D. C.

PAUL M. DUNN,
School of Forestry,
Oregon State College,
Corvallis, Oreg.

WILLIAM B. GREELEY,
West Coast Lumbermen's Association,
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DEWITT NELSON,
Division of Forestry,
Department of Natural Resources,
Sacramento 14, Calif.

JAMES C. EVENDEN,
Bureau of Entomology and Plant Quarantine,
U. S. Department of Agriculture,
Coeur d'Alene, Idaho.

CLARENCE S. HERR,
Woods Department,
Brown Company,
Berlin, N. H.

JOHN W. SPENCER,
U. S. Forest Service,
Post Office Building,
Denver 2, Colo.

This is S.A.F. Election Year. Nominations Invited for President and Council

All members are hereby notified that the regular biennial election will be held next December 10. A president, vice president, and nine other members of the Council will be elected for the two-year term 1950-1951.

Any or all of the present Council may be renominated, provided they accept the nomination in writing. However, President Martin has announced that he will not be a candidate for reelection.

Membership on the Council is restricted by the Constitution to Members (formerly Senior Members) and Fellows. Any Member or Fellow is eligible to hold office who is in good standing and who accepts the nomination in writing and declares his willingness to serve if elected.

Each voter will have an opportunity to ballot on all candidates for office. Candidates for the office of president are voted on separately; the candidate who receives the highest vote is declared elected president, and the candidate who receives the next highest vote is declared elected vice president.

The nine remaining Council members are elected in accordance with the system of proportional representation. The procedure of proportional representation will be explained in a later issue of the JOURNAL. It is the system by which the Society has been electing Council members for the past decade.

How Nominations Are Made

The Constitution (Article VIII, Section 2) states the conditions under which nominations are made by petition.

1. Each petition shall name but one candidate.
2. All candidates must be eligible to hold elective office.
3. A petition shall bear the signatures of at least ten voting members who at the time of signing the petition are eligible to vote in the coming election. (Eligible voting members are Junior Members, Members, and Fellows in good standing.)
4. A voting member may not sign more than one nominating petition for member of the Council.
5. Petitions must be in the hands of the Nominating Committee by October 15.

The Society has no special form for submitting nominating petitions. They may be written as follows:

"We, the undersigned voting members of the Society of American Foresters, hereby nominate

John Doe, a Member (or Fellow), for the office of president (or member of the Council) for the two-year term 1950-1951."

All nominating petitions should be sent promptly to the Society's executive office.

Nominating Committee

According to the Constitution (Article VIII, Section 1) a Nominating Committee has been appointed by President Martin. The Committee is composed of the following members:

Chairman, William W. Nace, Soil Conservation Service, Oakland, Md.

Merrill E. Deters, University of Idaho, Moscow.

R. Bruce MacGregor, Southern Pine Association, Macon, Ga.

Charles R. Ross, State Extension Service, Corvallis, Ore.

Harry W. Woodward, State Department of Game, Fish and Parks, Pierre, S. Dak.

This committee is charged with the following duties:

1. To set the date of the election. (December 10 is the date.)

2. To provide for at least two candidates for the office of president, and at least nine candidates for membership on the Council.

3. To receive separate nominating petitions for the office of president and for each member of the Council, and to supplement such petitions when necessary with other nominations in order to comply with item *2* above.

The Nominating Committee will make no nominations of its own unless the voting membership fails to make the required minimum number of nominations by petition. Voting members should accordingly get busy and make their own nominations.

Nominations Received

Up to the time of going to press with this issue, the following nominations had been received.

For President

Charles F. Evans, U. S. Forest Service, Atlanta, Ga. (Southeastern Section.)

For the Council

Lloyd P. Blackwell, Louisiana Polytechnic Institute, Ruston, La. (Gulf States Section.)

Frank H. Kaufert, University of Minnesota, St. Paul, Minn. (Upper Mississippi Valley Section.)

E. W. Littlefield, New York Conservation Department, Albany, N. Y. (New York Section.)

Stuart Moir, Western Forestry and Conservation Association, Portland, Ore. (Columbia River Section.)

Gordon D. Marckworth, University of Washington, Seattle, Wash. (Puget Sound Section.)

George S. McIntire, Division of Forestry, Michigan Department of Conservation, Lansing, Mich. (Central States Section.)

Earl Porter, International Paper Company, Mobile, Ala. (Southeastern Section.)

The Coming Election of Fellows. How Fellow Nominations Are Made

All Members (formerly Senior Members) and Fellows of the Society are hereby advised that nominations for the grade of Fellow are now open. The election of Fellows will be held at the time of the Society's regular biennial election next December 10.

As defined by the Constitution (Article III, Section 6), "Fellows shall be foresters of outstanding achievement as leaders in responsible directive or distinctive individual work of a fruitful character. They shall be elected from the Members and shall be engaged in forestry work at the time of their election."

Nominations Are Made by Petition

The procedure for placing Members in nomination for the grade of Fellow is by petition. The Society has no printed form for this purpose, the petition may be typewritten thus:

"We, the undersigned Members and Fellows of the Society of American Foresters, hereby nominate ———————— to the grade of Fellow for the regular election of 1949."

Remember these simple rules:

1. A petition may not name more than one candidate.

2. It must be signed by 25 Members or Fellows in good standing.

3. It should be accompanied by a factual, not eulogistic, biographical sketch of at least 200 words giving an account of his professional career and accomplishments.

4. It must be received in the executive office of the Society in Washington, D. C., not later than October 15.

The executive employees of the Society cannot be responsible for obtaining signatures on partially completed petitions or on petitions incomplete by reason of unacceptable signatures (that

is, signatures of other than Members and Fellows in good standing).

Election Procedure

Fellows are not elected by the membership at large, but by a board of electors which consist of all present Fellows and the present Council. (A Council member who is also a Fellow has but one vote.)

A form of preferential voting is prescribed by the Constitution and Bylaws by which the electors indicate first, second, and third choices. The system is described in Bylaw 21. To win election a candidate must receive an affimative vote of not less than one-half the total eligible votes cast.

Significance of the Grade

The highest distinction that can be conferred on a member by the Society, this grade is awarded in recognition of outstanding achievement. Fellows do not pay increased dues; their dues are the same as those of Members.

Since the Society was founded in 1900, there have been 66 Fellows elected. At the present time the number of living Fellows is 50. Since the last election in December 1947, four Fellows have died: William G. Howard of New York; Aldo Leopold of Wisconsin; G. A. Pearson of Arizona; and Hugo Winkenwerder of Washington.

List of Fellows

The current roster of Fellows follows. The state in which each Fellow is domiciled and the year of his election are shown after his name.

Allen, Shirley W. Michigan. 1948.
Baker, Hugh P. Massachusetts. 1948.
Bates Carlos G. Minnesota. 1940.
Besley, Fred W. Maryland. 1940.
Butler, Ovid. Maryland. 1940.
Carter, E. E. District of Columbia. 1942.
Chapman, H. H. Connecticut. 1922.
Cheyney, E. G. Florida. 1944.
Clapp, Earl H. Maryland. 1930.
Coffman, John D. District of Columbia. 1946.
Dana, Samuel T. Michigan. 1935.
Eldredge, I. F. Louisiana. 1942.
Fischer, Arthur F. California. 1940.
Frothingham, Earl H. California. 1942.
Gifford, John C. Florida. 1942.
Gill, Tom. District of Columbia. 1948.
Girard, James W. Oregon. 1944.
Granger, C. M. District of Columbia. 1946.
Graves, Henry S. Connecticut. 1918.
Greeley, William B. Washington. 1918.
Guthrie, J. D. Virginia. 1942.
Hall, William L. Arkansas. 1940.
Hawes, Austin F. Connecticut. 1939.
Hawley, Ralph C. Connecticut. 1942.
Holmes, J. S. North Carolina. 1939.
Hosmer, Ralph S. New York. 1932.
Illick, J. S. New York. 1946.
Jeffers, D. S. Idaho. 1948.
Kinney, J. P. District of Columbia. 1942.
Koch, Elers. Montana. 1940.
Korstian, Clarence F. North Carolina. 1942.
Lowdermilk, Walter C. California. 1948.
MacDonald, G. B. Iowa. 1944.
Marsh, R. E. District of Columbia. 1948.
Martin, Clyde S. Washington. 1948.
Mason, D. T. Oregon. 1948.
Mulford, Walter. California. 1939.
Munger, T. T. Oregon. 1946.
Peavy, G. W. Oregon. 1939.
Peck, Allen S. Colorado. 1946.
Preston, John F. Maryland. 1948.
Schmitz, Henry. Minnesota. 1940.
Show, S. B. District of Columbia. 1948.
Siecke, E. O. Texas. 1946.
Sparhawk, W. N. New Hampshire. 1946.
Spring, Samuel N. New York. 1939.
Watts, Lyle F. District of Columbia. 1946.
Winslow, C. P. District of Columbia. 1942.
Wirt, George H. Pennsylvania. 1948.
Zon, Raphael. Minnesota. 1918.

Second Petition Delays Referendum Authorized By the Council

Last October a petition signed by 125 voting members of the Society was submitted to the Council. The petitioners requested the Council to authorize a referendum on a provision of Senate bill 580 of the 80th Congress which would have permitted the transfer of some 462,000 acres of national forest in Oregon from the U. S. Forest Service to the Bureau of Land Management of the Department of the Interior.

This petition, together with certain explanatory material, was published in the JOURNAL OF FORESTRY for February 1949 (pages 153-155).

At a meeting of the Council, held in Boston last December, the referendum was approved. The executive secretary was instructed to submit it to the Society membership for mail vote in accordance with Article VII, Section 3 of the Constitution and Bylaw 54. Moreover, the Council directed that when the ballot was mailed out, it should be accompanied by explanatory statements in opposition to, as well as in support of, the petition so that when voting the members might have both sides of the question.

Bylaw 54 provides that referendum ballots shall be mailed out only after the members have received at least two issues of the JOURNAL subsequent to the original publication of the pro-

posal. Inasmuch as original publication occurred in the February issue, April was the earliest month that the ballots could have been distributed. Plans were accordingly made in the Society's executive office to send out the ballots in April.

A Second Petition Submitted

However, shortly after the February issue of the JOURNAL was delivered, a second petition, dated February 16, 1949, was initiated in the Columbia River Section and submitted to the Council. It requests the Council not to submit the issue to vote, and its intention is to stop action on the proposed referendum. This petition, which is self-explanatory, follows:

It has come to the attention of the Committee on Professional Policy and Ethics of the Columbia River Section of the Society of American Foresters that the Council has approved a referendum on Senate Bill 580 of the 80th Congress (Senate Bill 148 of the 81st Congress), which provides for the transfer of the so-called controverted lands from the Department of Agriculture to the Department of the Interior and for the subsequent exchange of forest lands between these two agencies. We, the undersigned members of the Committee on Professional Policy and Ethics of the Columbia River Section of the Society of American Foresters, together with the following voting members of the Society, hereby petition the Council to desist and refrain from submitting this controversial, political and nonprofessional issue to the vote of the membership at large. We base our position on the contention that the subject does not come within the purview of Article II of the Constitution of the Society.

L. B. Alexander
Robert Aufderheide
George H. Barnes
Jesse L. Bedwell
Dick Berry
Dale N. Bever
Mike Bigley
L. H. Blackerby
George E. Bradshaw
Philip A. Briegleb
W. H. Christy
George W. Churchill
A. P. Collins
L. L. Colvill
R. W.Cowlin
Owen P. Cramer
William A. Davies
Herman C. Dill
J. R. Dilworth
John C. Dozier
R. C. Elmgren
Sherman Feiss
R. L. Furniss
Lawrence C. Gangle
James W. Girard
Spencer B. Gross
J. A. Hall
John H. Hann
Robert W. Harris
G. Lloyd Hayes
Marvin L. Helland
Karl D. Henze
B. E. Holtby
R. C. Howell
Wayne G. Hubbard
A. J. Jaenicke
George A. James
Floyd A. Johnson
R. M. Kallander
R. S. Kearns
Dahl Kirkpatrick
Gene D. Knudson
Edward S. Kotok
Charles H. Ladd
Charles S. Lewis
Paul F. Liniger
Walter H. Lund
A. R. Lundeen
E. H. MacDaniels
Ralph Marlatt
E. H. Marshall
Larry T. Marshall
David T. Mason
E. E. Matson
Calvin D. Maus
Carl E. Mayer
W. F. McCulloch
Austin D. McReynolds
S. T. Moore
Floyd L. Moravets
William G. Morris
Vance L. Morrison
H. I. Nettleton
Fred W. Newell
Charles E. Ogle
L. B. Pagter
William N. Parke
Alvin L. Parker
H. R. Patterson
George W. Peavy
Joseph F. Pechance
M. J. Pike
T. B. Plair
Robert B. Pope
W. E. Ragland
Charles E. Reynolds
C. W. Richen
Charles A. Rindt
A. K. Roberts
Nelson S. Rogers
Wm. Ruhmann
Robert H. Ruth
Paul M. Sanders
Fred J. Sandoz
Roy R. Silen
James E. Sowder
G. Spaur
Bruce Starker
T. J. Starker
L. L. Stewart
Darryl E. Storm
Elmer Surdam
B. Sam Taylor
T. G. Taylor
Gail M. Thomas
Edwin Tippner
R. T. Titus
Charles E. Tyler
T. M. Tyrrell
W. I. West
W. W. Wetzel
J. M. Whiteside
Albert Wiesendanger
R. C. Wilson
Kendall B. Wood
John B. Woods, Jr.
Ernest Wright
R. A. Yoder

Constitutional Procedure

At this point certain provisions of the Society's Articles of Incorporation, Constitution, and Bylaws must be studied in order to comprehend the somewhat unusual circumstances brought about by the second petition. The following quoted extracts comprise all the pertinent sections of the Constitution and Bylaws.

From the Articles of Incorporation. "The particular business and objects of the Society are to encourage a broad and constructive practice of forestry; to stimulate research and achievement in the science of forestry; and to advance the profession of forestry through cooperative thought and a spirit of solidarity among foresters."

From the Constitution, Article II. "The objects of this Society shall be to represent, advance, and protect the interests and standards of the profession of forestry, to provide a medium for exchange of professional thought, and to promote the science, practice, and standards of forestry in America."

From the Constitution, Article VII, Section 3. "Any action of the Council may be brought before the Society at large on written petition of not less than fifty voting members. This provision shall not apply to jurisdiction over cases of disciplinary action nor to administrative mat-

ters, including the appointment or dismissal of the Executive Secretary, in which cases the decision of the Council shall be final."

From Bylaw 54. "The Council shall as need arises formulate and publish statements expressing the position or attitude of the Society on matters coming under the provision of Article II of the Constitution. On any subjects on which the membership has voted through a referendum, such statements shall be in conformance with the position thus taken by the Society. The Council may on its own initiative refer any such statements to the membership for ballot, and shall do so in case of valid appeal from its action, when taken by members in conformity with Article VII, Sec. 3, unless within two months from the date of receipt of said appeal the Council decides to adopt the position of the petitioners.

"Referendum ballots when required by the above procedure shall be mailed only after the members have received at least two issues of the JOURNAL and S.A.F. AFFAIRS subsequent to the original publication of the proposals. Discussions of such proposals should preferably appear in these publications, but if deemed necessary by the Council or by the proponents brief summaries may also accompany the ballot. The final date for receiving ballots shall be five weeks from the date of mailing the same, and this final date shall be indicated on the ballot.

"Appeal against actions or positions taken by the Council shall not operate as an injunction against said action in matters of immediate importance as affecting public or other measures in which delay might cause the Society and profession to suffer damage, and in which the Council has reasonable grounds for believing that it represents the majority opinion of the members, or on which the Society has previously determined its position. The right of appeal by petition of a small group shall not thus operate to thwart the purposes of the Society as interpreted by the elected Council, but shall serve, in absence of voluntary submission of a referendum by the Council, to bring about a determination, after proper discussion and deliberation by the membership, of any action of the Council as defined in Article VII, Sec. 3."

Legal Opinion Obtained

In order to aid the Council in reaching a decision as to the proper course of action to follow, it was believed desirable to submit the problem posed by the conflicting petitions to an impartial referee for a legal interpretation of the Constitution and Bylaws. Counsel was therefore sought from Julius Kahn of New York City, a practicing attorney at law, a graduate forester, and a Member of the Society. Mr. Kahn has never had governmental or industrial connections in forestry. He had previously made studies of the Constitution and Bylaws of our Society, as well as those of other professional societies, in connection with the development of our recently adopted code of ethics.

In March Mr. Kahn submitted his legal opinion which is summarized as follows:

1. The referendum authorized by the Council is consistent with the Society's Articles of Incorporation and the Constitution. "It is professional activity for a professional society to deliberate on the public questions in its field. . . ."

2. Orderly procedure requires that the second petition be disposed of before the proposed referendum.

3. The ballot can be arranged so as to provide first for a vote on the appeal, and second for a vote on the referendum.

4. Should the second petition be sustained by the membership, no further consideration would be given to the referendum.

5. Should the second petition be rejected, the referendum would then proceed as originally authorized.

The Council's Decision

As of April 7, all members of the Council had studied the problem and had submitted their votes to President Martin. The Council's decision was nine to one in favor of following the legal procedure recommended by Mr. Kahn.

In accordance therewith, two ballots will be designed and mailed out together to provide for two votes: (1) on the question as to whether or not the referendum should be held, and (2) on the referendum itself.

Should a majority of those voting decide against the proposed referendum, no further consideration will be given to it.

Should a majority of those voting decide in favor of the proposed referendum, the votes on the referendum itself will then be counted.

Although superficially it may appear that the two ballots are mutually exclusive, such is not necessarily the case. For example, certain members might desire to support the principle of right of petition, thus voting to hold the ref-

erendum; but at the same time they might disagree with the purpose of the referendum and vote against it. Conversely, other members might conceivably desire to take a stand against holding referenda on such issues, thus voting "no" on the first proposition; but voting "yes" on the second ballot on the basis that if the referendum is held after all, they want to be counted against transfer of national forest land. In short, all members will be urged to vote on both ballots.

In order to comply with Bylaw 54, two issues of the JOURNAL, subsequent to this one, must appear before the ballots may be mailed out. Accordingly, the ballots cannot be distributed before August.

New Bill Introduced

Senator Guy Cordon of Oregon has introduced a new bill in Congress relating to the O & C lands. It is S. 148 and has been referred to the Committee on Interior and Insular Affairs.

This bill is reprinted as follows for the information of voting members who will later be asked to ballot on the referendum.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purposes of the Act entitled "An Act relating to the revested Oregon and California Railroad and reconveyed Coos Bay Wagon Road grant lands, situated in the State of Oregon," approved August 28, 1937 (50 Stat. 874), the authority of the Secretary of the Interior with respect to the administration of the revested Oregon and California Railroad grant lands shall be deemed to extend to, among other lands, all the unpatented lands in the odd-numbered sections included within the indemnity limits of the grant made to such railroad by the Act of July 25, 1866 (14 Stat. 239), as amended, and for which payment was made by the United States to such railroad or its successors in interest under the Act of June 9, 1916 (39 Stat. 218), except the portions of such unpatented lands which have been specifically placed under the jurisdiction of an executive department (other than the Department of the Interior) since June 9, 1916, by an Act of Congress.

Sec. 2. The Secretary of the Interior and the Secretary of Agriculture are authorized and directed, as soon as practicable after the enactment of this Act, to exchange administrative jurisdiction of revested Oregon and California Railroad grant lands or reconveyed Coos Bay Wagon Road grant lands lying within the boundaries of any national forest, and national-forest lands of approximately equal aggregate value, when by such exchange the administration of the lands will be facilitated: Provided, That the said national-forest lands, administrative jurisdiction of which is transferred to the Secretary of the Interior, shall be excluded from the national forest and shall become subject to administration under the same provisions of law as the revested or reconveyed lands in exchange for which they were transferred, and the revested or reconveyed lands, administrative jurisdiction of which is transferred to the Secretary of Agriculture, shall become a part of the national forest within the boundaries of which they are situated and subject to administration under the laws applicable to such national forest: Provided further, That the revested or reconveyed lands and the national-forest lands, administrative jurisdiction of which is exchanged in any county, shall be approximately equal aggregate value: Provided further, That those certain revested Oregon and California Railroad grant lands, described in the Acts of February 11, 1920 (41 Stat. 405), September 22, 1922 (42 Stat. 1019), and June 4, 1936 (49 Stat. 1460), shall, for the purpose of exchange under the terms of this section, be deemed to be revested Oregon and California Railroad grant lands and subject to exchange for national-forest lands. The exchanges provided for herein shall in each case be evidenced by an order signed by the Secretary of the Interior and the Secretary of Agriculture and such orders shall be transmitted to the Division of the Federal Register for filing and publication.

S.A.F. Division of Forest-Wildlife Management Meeting

The Division of Forest-Wildlife Management held a meeting in conjunction with the Fourteenth North American Wildlife Conference on March 8, 1949, in Washington. Thirty members and a number of guests were present. Vice Chairman R. M. Rutherford presided. R. T. King briefly reported on the December meeting of the Division at Boston. His complete report on that meeting will be published in the *Proceedings*. Vice Chairman Rutherford referred to the published report of the St. Louis meeting of the Division published in the May, 1948 issue of the JOURNAL.

The subject of the meeting was the problem of placing a dollars-and-cents value on wildlife. This is one of the many intangibles with which foresters must necessarily deal. In the limited time available, only one proposal was discussed. Rudolph Dieffenbach, U. S. Department of the Interior, Fish and Wildlife Service, presented the proposed "Current Procedures for Evaluating Fish and Wildlife Resources and Unresolved Problems Attaching Thereto." He pointed out the charge from Congress in Public Law 739. This law requires that the Fish and Wildlife Service with the states investigate all federal water developments, including those operating under federal permit to determine the effects of these on fish and wildlife. The report on these investigations is required to be an integral part of any report on these projects. As a part of this investigation, an attempt is made to place a cash value on part of the present wildlife population. This is contrasted with the estimated wildlife population after the proposed installations are made.

It was pointed out that the values of anadromous fish and of fur animals is easy to obtain from commercial records. The valuation of sport animals is more difficult. In the face of criticisms of some economists, and support from others, the only usable base proposed so far is the expenditure by sportsmen assessed against the hunting bag. Those opposed to this base offer no alternate base, therefore it will probably be used. The details of arriving at these bases were explained.

In the discussion following this paper, there were a number of questions on the operation of the law requiring cooperation between federal agencies in working with major water manipulations. Such cooperation has been forthcoming and no misunderstandings have arisen.

Concerning wildlife valuation, it seemed to be the opinion of the meeting that while the proposed system had shortcomings, it did offer comparable bases for these purposes. Since no more accurate methods were possible, it should be used.

At the close of the meeting, Mr. Clepper made the point that the JOURNAL needs more articles on forest wildlife. Publication for papers on this subject was promised and the interest of the membership assured.

RICHARD M. MAY,
Secretary.

Report of Ozark Section Meeting March 11 and 12, 1949

The meeting was held at the LaFayette Hotel, Little Rock, Ark. on March 11 and 12, 1949. Approximately 95 members and guests were present; of this number 40 represented industry, 40 were from governmental services, and 15 came from educational institutions either as faculty or students in forestry.

Following registration the group was taken on a conducted tour of the Southwest Manufacturing Company in Little Rock by the owner, Fred Venner. The main plant makes baseball bats and a new addition is manufacturing metal boats.

After lunch the meeting proper got underway in the hotel with the presentation of a paper by C. R. Lockard on the work being done by the Southern Forest Experiment Station in the field of industrial research in conjunction with the Forest Products Laboratory in Madison. After this Arthur Bruce of the E. L. Bruce Lumber Company, Memphis, gave a talk on markets and conversion in the lumber industry. This part of the meeting was closed by W. L. Hall of Hot Springs who outlined the changes that have taken place in forests and forestry in southwest Arkansas and southeast Oklahoma during the past twenty-five years.

Entertainment at the banquet consisted of a wildlife film and talk given by Tom Mull of the Arkansas Game and Fish Commission. All agreed the film on wild duck in south Arkansas to be the best wild life photography any of us had seen.

Saturday morning was devoted to a business meeting.

JOHN C. BURWELL,
Secretary.

Northern Rocky Mountain Section News

S. Blair Hutchison and Donald N. Matthews of the U.S. Forest Service spoke to the Section at the January meeting. They summarized their 116-page report on the Development of a Blister Rust Control Policy for the National Forests in the Inland Empire, Station Paper No. 16, Northern Rocky Mountain Forest and Range Experiment Station.

The two speakers said that the control of blister rust is going to be considerably more expensive than was originally estimated. They have concluded, however, after studying the value of white pine to the regional economy and the nation as a high quality wood, that the public is more than justified in going ahead with blister rust control. In fact, they recommend proceeding with blister rust control program on a larger scale than in recent years.

Both men emphasized very strongly the necessity for closely coordinating blister rust control measures with other forest management work in the white pine stands. They pointed, also, to the need for speeding up research work in hormone sprays for the purpose of reducing the cost of control measures. Experiments with these sprays in killing Ribes plants, the alternate host, are very promising.

The February meeting was highlighted by an interesting dendrological dissertation on the

occurrence of cottonwoods in Montana. Wilfred W. White, former U. S. forest supervisor in Region 1, was the speaker and related his personal observations.

Mr. White estimated that he has covered 8,000 miles of the principal river valleys and streams of the state in his cottonwood studies. Black cottonwood, *Populus trichocarpa*, to his observation, is confined in Montana pretty much to the western portion of the state, but it is also to be found sparsely in Wyoming which is not shown on some distribution maps.

Mr. White said that leaf identification of cottonwood is often controversial, since the leaves alter their shape throughout the growing season and also show marked differences throughout the crown. He outlined his technique for positive identification by examination of the seed pods. He pointed out that black cottonwood possesses a 3-valved seed pod; whereas, balm of Gilead, *P. tacamahaca* var *candicans* has a 2-valved pod.

Increased use of cottonwood and related species in Montana and the considerations involved in their management helped stir the unusual interest in Mr. White's talk.

A discussion of the range research program in the United States was the topic of E. J. Woolfolk, speaker at the March meeting. Mr. Woolfolk is chief of the Division of Range Management at the Northern Rocky Mountain Forest and Range Experiment Station.

Range research furnishes knowledge and guides, otherwise obtainable only through costly and prolonged trial and error methods, for the intelligent use of range lands. The growth of this science has been retarded by the slow realization that more basic facts were essential to the highest sustained use of the Nation's range resource, he said.

The various range investigations under way at nine regional experiment stations were outlined by Mr. Woolfolk. He stated that range research is organized along three main lines; namely, grazing management, artificial revegetation, and range forage investigations. A fourth, noxious range plant control, was initiated at the Southwestern Station two years ago.

The discussion following the talk centered around such topics as airplane seeding, pellet seeding, and big game-livestock interrelationships.

BEN M. HUEY,
Reporter.

Foresters' Code of Ethics Printed and Available for Framing

The code of ethics for the forestry profession, adopted by letter ballot of the Society membership last fall, has been appropriately printed for framing.

It has been legibly and attractively printed in two colors, black and green, on heavy paper, 13 inches by 20 inches in size.

Many foresters will want to display a copy of this attractive document code in their offices. Any member may obtain it at cost by writing to the Society's headquarters in Washington, D. C.

Each member requesting a copy is asked to remit the nominal charge of 25 cents to cover the cost of printing, postage, and mailing tube.

Order yours today.

Names Dropped from Membership Roll[1]

In accordance with the bylaws of the Society all terminations of membership are published. I urge every member of the Society to check the list of "Dropped for nonpayment" and write to those whom he knows personally. Space does not permit the listing of addresses. If you do not know or your Section officers cannot give them to you they are available from the Society's office.

HENRY CLEPPER,
Executive Secretary.

Deceased

Fellow

Howard, Wm. G.
Pearson, G. A.

Member

Anderson, Lionel C.
Billings, C. L.
Brewster, Donald R.
Calkins, Hugh G.
Dorman, Lester H.
Haines, Roscoe
Matthews, D. M.
Murphy, H. A.
Wales, H. Basil
Weber, H. G.
Wilson, Sinclair A.

Junior

Bedford, Jack M., Jr.
Haskell, Frank E.
Jones, Harold H., Jr.
Pearce, John
Taylor, George R.
Welch, Jack

Affiliate

Markham, Alton M.
Wright, Howard S.

Associate

Houghton, Augustus S.
Treyz, G. Victor

Resigned in Good Standing

Member

Ahrenholz, Frederick W.
Anderson, Clarke A.
Baldwin, Donald D.
Byers, Theodore K.
Clocker, Everett H.
Davis, Joseph J.
Dieffenbach, Rudolph
Furst, Frederick Wm.
Gramling, Joseph R.
Gray, Allen R.
Janouch, Karl L.
McDonald, John E.

[1]Since publication in the July, 1948 JOURNAL OF FORESTRY.

McNutt, Jack J.
Merrill, Harry R.
Middour, J. C.
Miller, Harold W.
Myers, R. V.
Nellis, J. C.
Nelson, Jesse W.
Nordstrom, George T.
Painter, Wayne F.
Parker, Sterling E.
Pearce, Irving F.
Pike, Joseph B., Jr.
Provencher, Paul
Ramsey, Guy R.
Rapraeger, Elmer F.
Segersten, A. A.
Sellers, Victor O.
Silvius, Arthur C.
Spence, Liter E.
Stratton, Harold M.
Swanson, John L.
Titus, Robert U.
Vanderwall, E. J.
Webb, Clyde S.
Woods, J. B.

Junior

Aaron, M. Isador
Angus, C. B.
Armstrong, Jr., J. O.
Bagley, Walter T.
Baker, Richard C.
Baker, Robert N.
Beard, J. Austin
Blake, Joseph
Blanks, Herbert B.
Breen, John E.
Bremicker, Joel H.
Buxton, Dale J.
Carolin, Valentine M.
Carr, John A.
Chute, Gordon L.
Clarke, Stanley C.
Crowell, John C.
Crowther, C. Richard
Davis, Richard B.
Deppa, J. W.
Diffenbaugh, Jr., Harry
Dubuar, Carroll M.
Duncan, David
Eikum, Robert
Eschmeyer, Paul H.
Fallman, John A.
Fenby, Edwin J.
Fiedler, Howard W.
Fore, Boyd, Jr.
Fox, Charles E.
Ginter, Paul L.
Gottschalk, F. W.
Grace, Harry D.
Halbrook, Quincy X.
Hansen, J. Deloy
Harbison, Donald E.
Harden, Edward Wesley
Harrington, C. L.
Harris, Ernest A.
Hector, Fred L.
Holbrook, Edward L.
Humbert, John J.
Janowski, Albert F.
Johnson, Richard C.
Kauppinen, Tyyri E.
Kempf, Luntpuld W.
Kincaid, Eugene H.
Knoblauch, Charles J.
Kriss, Paul B.
Krofchek, Andrew W.
Kuehner, Roy C.
Lagemann, Albert T.
Lane, Loren E.
Lee, George R.
Lister, P. B.
Lyda, E. M.
McMahon, Thomas F., Jr.
Marion, Edmund
Middleton, Robert L.
Milius, Hans C.
Miller, John C.
Miller, Samuel L.
Mitchell, Yale
Mothersbaugh, C. E., Jr.
Moyer, Paul E.
Musante, Charles J.
Myers, Robert M.
Nelson, Ben
Nicholson, James A.
Nord, Eamor C.
Overholt, David P.
Pearson, L. Everett
Perpich, Tony F.
Peterson, Harmel M.
Pickford, G. D.
Pitsker, Philip A.
Price, William L.
Quick, Horace F.
Radford, Arthur L.
Rapp, William H.
Rattle, Paul S., Jr.
Reagin, Charles E.
Robinson, Donald H.
Rumazza, O. Lawrence
Salato, Michael A.
Seemann, Louis N. A.
Settel, Sylvan
Shaver, Raymond A.
Sill, Raymond P.
Simon, Robert G.
Smith, Edwin E.
Smith, Lyle F.
Stanford, Jack A.
Stark, Anthony E.
Stock, Merlin R.
Stone, Frederick M.
Swank, Wendell G.
Syska, Arthur D.
Tallmon, Willard B.
Tucker, A. M.
Uhlhorn, C. F.
Walker, E. H.
Walker, Frederick R.
Walker, Robert Hugh
Wallihan, Ellis F.
Walters, Stanley C.
Welch, William E.
Weston, Stanley J.
Williams, Alva B.
Williams, Roger
Williams, Dr. Simon

Affiliate

Beebe, John C.
Edin, Ralph J.
Szuszitzky, Veldon P.
Walker, Melville A.

Associate

Bess, Henry A.
Chandler, Robert F., Jr.
Hopkins, H. T., Jr.
Munson, Spencer M.
Nielson, R. D.
Slye, Raymond
Swingle, Charles F.

Resigned in Arrears

Member

Mottet, Arthur L.
Petheram, H. D.

Junior

Allyn, William J.
Burwell, Robert W.
Byassee, James F.
Clifton, Gordon K.
Langford, Daniel B.
Morgan, William D.
Orcutt, Charles, Jr.
Orr, Gilbert McMaster
Petersen, W. G.
Rulison, Donald E.
Scott, Harry Melvin
Singley, J. Andrew

Dropped, Nonpayment of Dues

Member

Barron, Melvin E.
Bradshaw, Ray M.
Ericson, Eric, Jr.
Hodge, G. H.
Milnes, George S.
Moll, Wilford P.
Northup, George H.
Phillips, J. Elbert
Pierson, Royale K.
Schaeffer, Charles H.
Shulley, Frederick J.
Spain, W. W.
Spencer, M. S.
Thoresen, Carl T.
Walley, J. M.
Wood, Richard A.

Junior

Anderson, Roan C.
Andrews, Stuart R.
Arnold, Frederick J.
Astle, Walter S.
Barron, Keith V.
Battell, Samuel M.
Beatty, E. W.
Beck, Roy R.
Bigsby, Gerald W.
Boutwell, Lewis S.
Boyns, Charles F.
Bradley, Roy L.
Budelier, C. J.
Bynum, Clyde H.
Calef, Jeremiah F.
Calhoun, John C.
Carter, Victor I.
Clark, W. Kimball
Conrad, Norman H.
DesForges, Van Vranken
Dolgaard, Sam
Ebert, Arthur J.
Epstein, Herbert L.
Everett, Charles M.
Findlay, John D.
Finlinson, Rich L.
Ford, R. E.
Forsman, John S.
Fulton, William S.
Gable, Thomas O.
Geiger, Harold W.
Gibson, Daniel E.
Haderle, John A.
Hartsock, Charles M., Jr.
Heffelfinger, Vernon E.
Herkenham, Norman B.
Hodgin, Floyd M.
Howard, Winston B.
Hunter, Gerald Robert
Jacobs, Alfred H.
Johnson, Raymond E.
Jones, John D.
Keeling, Robert F.
Kellstedt, Paul A.
Kocher, Ernest F.
Lepley, Thomas C.
Lesselbaum, Harold R.
Lewis, Perle
Lillevig, Carlyle J.
Little, C. Olin
Lucas, Broder F.
Lundh, Roy W.
Makel, Carl Alfred
Mann, James M.
Marcus, Murray
Margosan, Richard
Martin, Festus
May, William W.
Mealey, Robert H.
Miller, Warren G.
Moir, Arthur D.
Myers, Melvin C.
Myers, Myron S.
Nelson, Harold Albert
Ohl, Thomas H.
Packard, Henry D.
Parsons, Frank Douglas
Pastornak, Milton
Paton, Andrew
Peneton James E.
Plowden, John G.
Price, Lawrence H.
Ramsdell, Richard T.
Rohn, Don C.
Ryder, Edwin Witman
Saville, Richard M.
Schierbaum, Donald L.
Scott, Charles O.
Severance, Donald S.
Shaylor, L. LeRoy
Short, Robert D.
Smith, John E.
Sovulewski, Robert
Spooner, Charles S., Jr.
Stacey, Edgar T.
Stearns, A. C.
Stevens, Wingate I.
Stover, Harold G.
Swift, Ralph J.
Thomas, Julian R.
Thomson, Stanley
Van, Stratton H.
Verduin, Willard Prince
Whitehurch, Gale M.
Wilson, Thomas A.

Affiliate

Dare, Clarence E.
Houghton, Gilbert M.
McCoy, Thomas F., Jr.
McLees, John R.
Mitchell, Milton R.
Myers, Paul D.

Associate

Foley, Joseph
Hallauer, Frank J.
Hornaday, Fred E.
Markham, Ben S.
Shipman, Jack K.

Elections to Membership

Affiliate

Christiansen, P. C., Wis.
Walde, E. S., Minn.

Associate

Bray, J. M., N. Y.
Davidson, R. W., Md.
Fowler, M. E., Md.
Legett, Albert A., Miss.

Junior

Bergeron, J. R., Minn.
Bowman, E. E., Ariz.
Brenneman, W. S., Mich.
Chern, J., Minn.
Chrisler, D., Md.
Cooper, L. J., Ore.
Cunningham, G. R., Pa.
Dick, M. R., Wash.
Durham, G. V., N. C.
Easton, M. H., Ore.
Hodge, W. C., Mont.
Holmes, C. A., Minn.
Judson, G. M., Tex.
Kelsey, F. B., Ind.
Livens, W. H., Mo.
Logan, B. A., Canada.
MacAllister, J. G., Ind.
Mallery, W. T., Ore.
Maycock, C. P., Alaska.
McGinnies, W. J., Utah.
Mogren, E. W., Minn.
Moreland, D. E., N. C.
Morgan, R. S., Idaho.
Morlock, J. F., Ariz.
Nugent, B. A., S. C.
O'Donnell, J. E., Jr., Me.
Phillips, H. D., N. Y.
Rehfeldt, R. F., Ariz.
Richards, R. E., N. Y.
Sanderson, J. E., Idaho.
Seaberg, D. R., Jr., Idaho.
Skinner, L. R., N. Y.
Soderberg, P. E., Wash.
Sperry, R. D., Calif.
Williams, D. F., Wash.
Zink, R. M., Idaho.

Member

Baisinger, D. H., Ore.
Burke, M. H., Ore.
Colvill, L. L., Ore.
Colwell, W. L., Jr., Calif.
Dick, J., Ore.
Green, B., Ill.
Liming, F. G., Mo.
Mullin, G. B. P., N. H.
Romeiser, G. C., D. C.
Romnes, R., Wis.
Rowbury, J. G., Ore.
Seeley, H. M., Minn.
Zettle, D. G., Mich.

Reinstated

Junior

Brown, L. R., Pa.
Wells, S. D., Wis.
Young, C. M., Hawaii.

Member

Allen, R. K., Canada.

Announcement of Candidates for Membership

The following names of candidates for membership are referred to the membership for comment or protest. The list includes all nominations received since the publication of the May JOURNAL without question as to eligibility. Names, addresses, education, and endorsements are given. The names have not been passed upon by the Council. Important information regarding the qualifications on any candidate which will enable the Council to take final action with a knowledge of essential facts should be submitted before July 15, 1949. Statements on different men should be submitted on different sheets. Communications relating to candidates are considered as strictly confidential.

Allegheny

Junior Membership

Goodheart, W. J., Forester, N. E. Forest Exp. Sta., Elkins, W. Va.; Purdue, B.S.F., 1942. S. Weitzman, R. D. Wray, C. J. Holcomb.

Appalachian

Member Grade

Morin, R. A., Forest Mgmt. Asst., N. C. Dept. of Cons., Raleigh, N. C.; Univ. of Mich., B.S.F., 1942. Appalachian (Jr. member, 1945).

Central States

Junior Membership

Gysel, L. W., Asso. Prof., Mich. State College, East Lansing, Mich.; N. Y. State (Forest Botany), B.S., 1936; M.S., 1938. P. A. Herbert, Karl Dressel, E. J. Hodgkins.

O'Neil, W. J., Forester, U.S.F.S., Harrisburg, Ill.; Oregon State, B.S.L.E., 1917. Reinstatement.

Member Grade

Fix, William L., Dist. Ext. Forester, Purdue Univ., West Lafayette, Ind.; Purdue, B.S.F., 1943. Central States (Jr. member, 1943).

Schweigert, T. F., Cons. Forester, Walloon Lake, Mich.; Mich. State, B.S.F., 1939. Central States (Jr. member, 1947).

Columbia River

Junior Membership

Allen, D. E., Asst. Dist. Rgr., Umpqua Natl. Forest, Roseburg, Ore.; Washington State, B.S. (Forestry), 1943. Columbia River.

Cooper, Robert L., Forester, Rogue River Natl. Forest, Klamath Falls, Oregon; Oregon State, (4 yrs.). Columbia River.

Crowe, C. V., Student, Oregon State, Corvallis, Ore.; Oregon, B.S.F., 1949. Philip N. Knorr, R. F. Keniston, W. F. McCulloch.

Didriksen, R. G., Clerk, U.S.F.S., Trout Lake, Wash.; Univ. of Idaho, B.S., (Forestry), 1947. A. K. Robert, V. N. Olson, A. R. Standing.

Ellwood, R. L., Tech. Asst., S. W. Oregon Pro. Dist., Medford, Ore.; Oregon State, B.S.F., 1949. G. H. Barnes, J. B. Grantham, W. F. McCulloch.

Ericksen, Edmund, Student, Oregon State, Corvallis, Oregon; Oregon State, B.S.F., 1949. W. A. Davies, W. F. McCulloch, H. R. Patterson.

Hendrix, J. R., Fire Control Asst., Siuslaw Natl. Forest, Corvallis, Ore.; Oregon State, B.S.F., 1949. D. D. Robinson, G. H. Barnes, W. F. McCulloch.

Hiatt, H. C., Forester, U.S.F.S., Portland, Oregon; Oregon State, (3½ yrs.). Reinstatement.

Jewett, H. P., Tech Asst., Eastern Lane Forest Protective Asso., Springfield, Ore.; Oregon State, B.S.F., 1949. B. Starker, J. R. Dilworth, W. F. McCulloch.

Koskella, T. W., Student, Oregon State, Corvallis, Ore.; Oregon State, B.S.F., 1949. D. D. Robinson, W. F. McCulloch, G. H. Barnes.

McComb, D. P., Surveying & Tbr. Cruising, Bert Udell, Lebannon, Ore.; Oregon State, B.S.F., 1940. G. D. Knudson, F. J. Sandoz, E. L. Surdam.

Sommer, H. C., Forester, Weyerhaeuser Tbr. Co., North Bend, Ore.; Oregon State, B.S.F., 1949. G. H. Barnes, W. F. McCulloch, R. F. Keniston.

Stein, W. I., Forester, U.S.F.S., Portland, Oregon; Oregon State, B.S.F., 1948. N. P. Worthington, Ernest Wright, T. W. Childs.

Usher, J. H., U. S. Forest Service, Prineville, Ore.; Oregon State, B.S.F., 1949. P. N. Knorr, R. F. Keniston, W. F. McCulloch.

Gulf States

Associate Membership

Warner, S. R., Prof. of Botany, Sam Houston State Teachers College, Huntsville, Texas. Gulf States.

Junior Membership

Drews, R. J., Tbr. Marker, Int. Paper Co., Natchitoches, La.; La. State, B.S.F., 1948. T. MacClendon, C. W. Robertson, N. M. Gamso.

Franklin, C. R., Forester, Houston Band Mill, Inc., Livingston, Texas; Univ. of Ga., B.S.F., 1939. Reinstatement.

Griffin W. F., Dist. Forester, Int. Paper Co., Mobile, Ala. Gulf States.

Webster, J. B., Proj. Forester, Texas Forest Service, College Station, Texas; Univ. of Mich., B.S.F., 1949. Don Young, D. B. Austin, E. R. Mueller.

Inland Empire

Junior Membership

Bingham, R. T., Path., Blister Rust Control, Spokane, Wash.; Univ. of Idaho, B.S.F., 1940; M.S.F., 1942. Reinstatement.

Intermountain

Junior Membership

Lobenstein, H. L., Forester, Int. Forest and Range Exp. Sta., Ogden, Utah; Kansas State College of Agric., B.S., (Agric.), 1926. Intermountain.

New England

Affiliate Membership

Jacobs, Paul, Pres., Jaybuck Lbr. Co., Inc., Berlin, N. H. New England.

Junior Membership

Batey, T. E., Jr., Student, Yale, New Haven, Conn.; Univ. of Mass., B.S., (Forestry), 1947; Yale, M.F., 1949. G. A. Garratt, H. J. Lutz, D. M. Smith.

Curtis, R. E., Dist. Leader, Bur. of Ento. & Plant Quar., Cambridge, Mass. New England, (Aff. member, 1940).

Koenig, Walter L., Resident Forester, New England Forestry Foundation, Boston, Mass.; Oregon State, B.S.F., 1947; Duke, M.F., 1949. C. F. Korstian, R. B. Thomson, F. X. Schumacher.

New York

Junior Membership

Charlton, J. W., Asst. Path., Farm Bureau Office, Gloversville, New York; New York State, B.S.F., 1923. Reinstatement.

Edler, A. J., Jr., Asst. Forester, Mid-Hudson Forest Products, Inc., Kingston, N. Y.; N. C. State, B.S.F., 1949. R. J. Preston, Jr., J. W. Chalfant, W. D. Miller.

Lowe, J. L., Teacher, N. Y. State College of Forestry, Syracuse, New York; N. Y. State, B.S.F., 1927; Univ. of Mich., Ph.D., 1938. H. L. Shirley, L. P. Plumley, R. M. Hutchinson.

Rice, C. E., Student, N. Y. State, Syracuse, New York; N. Y. State, B.S.F., 1949. L. P. Plumley, R. M. Hutchinson, R. G. Unger.

Member Grade

Kagetsu, Hajime, Dist. Operating Forester, Marathon Paper Mills, Port Arthur, Canada; Univ. of B. C., (Forest Engr.), 1942. New York.

Northern California

Junior Membership

Ballenger, C. B., Forester, Calif. Indian Agency, Sacramento 2, Calif.; Utah State, B.S., (Forestry), 1948. W. B. MacMillan, G. T. Nordstrom, O. F. Orvola.

Dotta, D. D., Jr., Asst. State Forest Rgr., Div. of Forestry, Fresno, Calif.; Univ. of Calif., B.S.F., 1941. D. F. Schlobohm, D. E. Knowlton, C. E. Metcalf.

Phibbs, G. O., State Forest Rgr., Calif. Div. of Forestry, Sacramento, Calif.; Univ. of Calif., B.S.F., 1938. D. F. Schlobohm. D. E. Knowlton, C. E. Metcalf.

Northern Rocky Mountain

Junior Membership

Finch, T. L., Forester, U.S.F.S., Missoula, Mont.; Mont. State, B.S.F., 1947. M. B. Dickerman, C. L. Tebbe, A. B. Gundersen.

Member Grade

Drummond, J. P., Ext. Forester, Mont. Ext. Service, Bozeman, Mont.; Utah State, B.S.F., 1937; Oregon State, M.F., 1940. Northern Rocky Mountain (Jr. member, 1940.)

Stoltz, G. E., Asst. to Asst. Regional Forester, U.S.F.S., Missoula, Mont. Northern Rocky Mountain (Jr. member, 1942).

Ozark

Junior Membership

Goldsberry, W. M., Jr., Compass Man, Int. Paper Co., Camden, Ark.; Purdue, B.S.F., 1940. H. S. Winger, J. R. Stone, S. J. Tureski.

Hunt, O. R., Asst. Forester, Dierks Lbr. & Coal Co., DeQueen, Ark.; Colo. A & M., B.S.F., 1946. J. A. Bricken, Jr., J. C. Burwell, R. B. Gierow.

Schmidt, A. H., Farm Forester, Mo. Cons. Comm., Jefferson City, Mo.; Pa. State, B.S.F., 1937. G. O. White, W. E. Towell, A. B. Meyer.

Puget Sound

Associate Membership

Clarke, S. J., Director, State Parks and Recreation Comm., Olympia, Wash. Puget Sound.

Junior Membership

Johnson, F. J. G., Forester and Tbr. Mgr., Evans Prod. Co., Ltd., Vancouver, B. C. Puget Sound.

Upper Mississippi Valley

Junior Membership

Yurchyshyn, Dmytro, Forest Mgr., Iron Range Resources and Rehab., St. Paul, Minn. Upper Mississippi.

Member Grade

Wood, Raymond J., Ext. Asst. Forester, Agric. Ext. Div., St. Paul, Minn.; Univ. of Minn., B.S.F., 1938. Upper Mississippi Valley.

Washington

Associate Membership

Dietz, Martha A., Forest Economist, Div. of Forest Economics, U.S.F.S., Washington, D. C.; State Teachers College, B.S., (Education), 1934. Washington.

Honorary Membership

Drury, Newton Bishop, Director, National Park Service, U. S. Dept. of the Interior, Washington, D. C.; Univ. of Calif., LL.D., 1947. Washington.

The following have been Junior members for at least 6 years and are eligible for automatic advancement to Member grade. The Section has certified them as actively engaged in forestry work and competent to represent the profession honorably and capably in the performance of their duties.

Allegheny

Clouser, R. W., Forester, Glatfelter Pulp Wood Co., LaPlata, Md.; Pa. State, B.S.F., 1932. Allegheny (Jr. member, 34R47).

Duck, P. W., Dist. Forester, Pa. Dept. Forests and Waters, Harrisburg, Pa.; Pa. State, B.S.F., 1938. Allegheny (Jr. member, 1941).

Appalachian

Bashore, H. W., Gordonsville, Va. Appalachian (Jr. member, 40R43).

Brown, J. P., Box 624, Jacksonville, N. C. Appalachian (Jr. member, 35R44).

Drumheller, D. R., Farmville, Va. Appalachian (Jr. member, 36R47).

Gash, W. D., Raleigh, N. C. Appalachian (Jr. member, 1938).

Grieve, W. G., Va. Forest Service, Tappahannock, Va. (Jr. member, 37R48).

Guerrant, W. H., Algoma Orchards, Callaway, Va. Appalachian (Jr. member, 1942).

Huff, R. E., Mars Hill, N. C. Appalachian (Jr. member, 1943).

Johnson, S. J., U.S.F.S., Asheville, N. C. Appalachian (Jr. member, 1930).

Manchester, E. M., U.S.F.S., Lenoir, N. C. Appalachian (Jr. member, 1933).

McClay, T. A., 506 Morehead, Durham, N. C. Appalachian (Jr. member, 1943).

McElhinney, G. D., Logging Supt., Atlas Plywood Corp., Goldsboro, N. C.; Iowa State, B.S.F., 1936. Appalachian (Jr. member, 1942).

Myers, Leland F., P. O. Box 207, Purcellville, Va. Appalachian (Jr. member, 1939).

Nicholson, R. L., State College Sta., Raleigh, N. C. Appalachian (Jr. member, 1938).

Patton, F. W., Asst. Ext. Forester, Blacksburg, Va. Appalachian (Jr. member, 1940).

Price, H. R., Forestry Relations, Asheville, N. C. Appalachian (Jr. member, 1941).

Price, O., Fletcher, N. C. Appalachian (Jr. member, 1937).

Renshaw, E. W., U.S.F.S., Franklin, N. C. Appalachian (Jr. member, 26R35).

Riley, M. M., Portsmouth, Va. Appalachian (Jr. member, 1934).

Santopole, F. A., State College Sta., Raleigh, N. C. Appalachian (Jr. member, 1943).

Schmidley, F. X., Aberdeen, N. C. Appalachian (Jr. member, 1941).

Smith, L. R., U.S.F.S., Natural Bridge Sta., Va. Appalachian (Jr. member, 1924).

Stoneburner, W. H., Charlottesville, Va. Appalachian (Jr. member, 21R36R48).

Sundheimer, P. W., U.S.F.S., Roanoke, Va. Appalachian (Jr. member, 1938).

Toole, E. R., 223 Federal Bldg., Asheville, N. C. Appalachian (Jr. member, 1936).

Waite, D. M., Bristol, Va. Appalachian (Jr. member, 1940).

Ward, W. B., U.S.F.S., Norton, Va. Appalachian (Jr. member, 1934).

Williams, I. A., 316 Clovelly Rd., Richmond, Va. Appalachian (Jr. member, 1937).

Central Rocky Mountain

Avery, Ned A., U.S.F.S., Laramie, Wyo. Central Rocky Mountain (Jr. member, 1941).

Beals, W. F., U.S.F.S., Norwood, Colo. Central Rocky Mountain (Jr. member, 1929).

Beckley, W. S., III, U.S.F.S., Boulder, Colo. Central Rocky Mountain (Jr. member, 36R48).

Bennett, Raymond, River Springs Ranger Sta., Antonito, Colo. Central Rocky Mountain (Jr. member, 1938).

Chappell, C. C., U.S.F.S., Crested Butte, Colo. Central Rocky Mountain (Jr. member, 1936).

Clifton, O. S., Harney Ranger Sta., Keystone, S. Dak. Central Rocky Mountain (Jr. member, 1942).

Defler, S. E., U.S.F.S., Steamboat Springs, Colo. Central Rocky Mountain (Jr. member, 1937).

Dortignac, E. J., Delta, Colo. Central Rocky Mountain (Jr. member, 1936).

Erickson, E. S., U.S.F.S., Grand Junction, Colo. Central Rocky Mountain (Jr. member, 37R47).

Folkestad, J. O., U.S.F.S., Pitkin, Colo. Central Rocky Mountain (Jr. member, 1942).

Goodell, B. C., Rocky Mtn. For. & Range Exp. Sta., Ft. Collins, Colo. Central Rocky Mountain (Jr. member, 1937).

Harlan, Howard F., U.S.F.S., Delta, Colo. Central Rocky Mountain (Jr. member, 36R43).

Hovey, Albert B., U.S.F.S., Gunnison, Colo. Central Rocky Mountain (Jr. member, 37R47).

Hughes, H. R., U.S.F.S., Collbran, Colo. Central Rocky Mountain (Jr. member, 36R47).

Massey, I. M., U.S.F.S., Tensleep, Wyo. Central Rocky Mountain (Jr. member, 1942).

McKennan, R. B., U.S.F.S., Colorado Springs, Colo. Central Rocky Mountain (Jr. member, 1930).

Metz, L. J., Crawford, Colo. Central Rocky Mountain (Jr. member, 1942).

Miller, Elmer E., U.S.F.S., Colorado Springs, Colo. Central Rocky Mountain (Jr. member, 1936).

Minges, Ralph V., U.S.F.S., Denver, Colo. Central Rocky Mountain (Jr. member, 1940).

Poley, W. F., U.S.F.S., Monte Vista, Colo. Central Rocky Mountain (Jr. member, 1935).

Radel, J. T., U.S.F.S., Pueblo, Colo. Central Rocky Mountain (Jr. member, 1936).

Ratliff, Mark R., U.S.F.S., Del Norte, Colo. Central Rocky Mountain (Jr. member, 1930R45).

Rundgren, John A., U.S.F.S., Bailey, Colo. Central Rocky Mountain (Jr. member, 1934).

Smith, J. W., U.S.F.S., Wheatland, Wyo. Central Rocky Mountain (Jr. member, 1936).

Smith, Ned A., Rocky Mt. Forest & Range Exp. Sta., Ft. Collins, Colo. Central Rocky Mountain (Jr. member, 1943).

Spencer, Clifford C., U.S.F.S., Colorado Springs, Colo. Central Rocky Mountain (Jr. member, 1927).

Stagelman, Howard W., U.S.F.S., Ft. Collins, Colo. Central Rocky Mountain (Jr. member, 1935).

Sward, Carl A., U.S.F.S., Custer, S. Dak. Central Rocky Mountain (Jr. member, 1928).

Taber, Kenneth A., U.S.F.S., Sheridan, Wyo. Central Rocky Mountain (Jr. member, 1935).

Towne, Charles R., U.S.F.S., Delta, Colo. Central Rocky Mountain (Jr. member, 1934).

Wright, Edward, Gunnison National Forest, Gunnison, Colo. Central Rocky Mountain (Jr. member, 1936).

Wyatt, C. G., U.S.F.S., Centennial, Wyo. Central Rocky Mountain (Jr. member, 1938).

Central States

House, Ray W., Brazil, Ind. Central States (Jr. member, 1941).

Columbia River

Anderson, R. E., U.S.F.S., Hebo, Ore. Columbia River (Jr. member, 1936).

Armstrong, F. H. U.S.F.S., Bly, Ore. Columbia River (Jr. member, 1936R45).
Aydelott, O. L., U.S.F.S., Baker, Ore. Columbia River (Jr. member, 1936).
Baker, Ed., 3716 Daniels St., Vancouver, Wash. Columbia River (Jr. member, 1937).
Beil, Chester M., U.S.F.S., Sisters, Ore. Columbia River (Jr. member, 42R45).
Berry, Dick W., Salem, Ore. Columbia River (Jr. member, 1943).
Bottcher, R. P., P. O. Box 683, Bend, Ore. Columbia Rover (Jr. member, 1935).
Clark, C. L., U.S.F.S., John Day, Ore. Columbia River (Jr. member, 1936).
Clark, H. S., Box 156, Oakridge, Ore. Columbia River (Jr. member, 1943).
Croney, T. J., 267 E. 30th St., Eugene, Ore. Columbia River (Jr. member, 1942).
Cummings, L. A., U.S.F.S., Carson, Wash. Columbia River (Jr. member, 1943).
Cummins, W. F., U.S.F.S., Oakridge, Ore. Columbia River (Jr. member, 1933).
Ellstrom, R. W., U.S.F.S., Prineville, Ore. Columbia River (Jr. member, 38R47).
Feiss, S. H., 1242 W. 4th St., Eugene, Ore. Columbia River (Jr. member, 1943).
Galbraith, A. W., Klamath Agency, Ore. Columbia River (Jr. member, 1942).
Grant, R. C., 835 Terminal Sales Bldg., Portland, Ore. Columbia River (Jr. member, 1942).
Griffee, W. E., 510 Yeon Bldg., Portland, Ore. Columbia River (Jr. member, 25R36).
Groom, J. I., U.S.F.S., Lakeview, Ore. Columbia River (Jr. member 1935).
Hagenstein, W. D., 1410 S. W. Morrison, Portland, Ore. Columbia River (Jr. member, 1938).
Hanell, O. B., U.S.F.S., McKenzie Bridge, Ore. Columbia River (Jr. member, 1936).
Hixon, H. J., U.S.F.S., Portland, Ore. Columbia River (Jr. member, 1938).
Hornbeck, R. L., U.S.F.S., Waldport, Ore. Columbia River (Jr. member, 1941).
Hough, J. P., Westfir, Ore. Columbia River (Jr. member, 1936).
Johnson, Floyd A., 1511 N. E. 21st, Portland, Ore. Columbia River (Jr. member, 1942).
Kachin, Ted, 701 S. E. 106th Ave., Portland, Ore. Columbia River (Jr. member, 1936).
Kirkmire, Dana F., 820 K St., Springfield, Ore. Columbia River (Jr. member, 30R43).
Lamb, F. B., 835 Terminal Bldg., Portland, Ore. Columbia River (Jr. member, 1942).
Matson, E. E., U.S.F.S., Portland, Ore. Columbia River (Jr. member, 1943).
McLeod, Kenneth, 413 High St., Klamath Falls, Ore. (Jr. member, 25R47).
Obye, H. C., U.S.F.S., Grants Pass, Ore. Columbia River (Jr. member, 1936).
Pike, M. J., 4931 N. E. 37th Ave., Portland, Ore. Columbia River (Jr. member, 37R48).
Powell, H. G., U.S.F.S., Bly, Ore. Columbia River (Jr. member, 36R46).
Radcliffe, T. H., 1420 Pacific Terrace, Klamath Falls, Ore. Columbia River (Jr. member, 1943).
Read, W. B., % Gardiner Lbr. Co., Scottsburg, Ore. Columbia River (Jr. member, 31R39).
Reynolds, C. E., 7715 S. E. 32nd Ave., Portland, Ore. Columbia River (Jr. member, 1933).
Roberts, A. K., West Coast Lbrs. Assoc., Portland, Ore. Columbia River (Jr. member, 1935).
Sanders, P. M., Box 113, Eugene, Ore. Columbia River (Jr. member, 1940).
Smith, A. E., U.S.F.S., Prospect, Ore. Columbia River (Jr. member, 1941).
Talich, P. H., U.S.F.S., Agness, Ore. Columbia River (Jr. member, 1935).
Tedrow, Maurice, 317 Howard Ave., Medford, Ore. Columbia River (Jr. member, 1935).
Whitney, F. G., U.S.F.S., Ukiah, Ore. Columbia River (Jr. member, 1943).
West, W. I., Oregon State College, Corvallis, Ore. Columbia River (Jr. member, 1942).

Gulf States

Davis, Brooke R., Oxford, Miss. Gulf States (Jr. member, 1934).
Harshman, L. R., Bruce, Miss. Gulf States (Jr. member, 1942).
Hobba, Robert L., New Orleans, La. Gulf States (Jr. member, 1943).
Stone, W. E., Laurel, Miss. Gulf States (Jr. member, 1936).
Tofte, A. L., New Orleans, La. Gulf States (Jr. member, 33R47).

Kentucky-Tennessee

Burger, C. E., Covington, Tenn. Kentucky- Tennessee (Jr. member, 1935).
Steinert, E. H., Bolivar, Tenn. Kentucky- Tennessee (Jr. member, 1937).

Northern California

Arvola, T. F., 1538 Christopher St., Sacramento, Calif. Northern California (Jr. member, 1940).
Bacon, Elmer M., U.S.F.S., Susanville, Calif. Northern California (Jr. member, 36R46).
Bacon, Frederick W., U.S.F.S., San Francisco, Calif Northern California (Jr. member, 1933).
Bolick, Eri D., U.S.F.S., North Fork, Calif. Northern California (Jr. member, 1943).
Bosworth, Irwin E., Dunsmuir, Calif. Northern California (Jr. member, 1943).
Bower, Russell W., U.S.F.S., Quincy, Calif. Northern California (Jr. member, 1934R45).
Branagh, Henry E., U.S.F.S., King City, Calif. Northern California (Jr. member, 1943).
Burcham, Levi T., Asst. Forest Tech., Calif. Div. of Forestry, Fresno, Calif. Northern California (Jr. member, 1941).
Burnett, G. L., Alturas, Calif. Northern California (Jr. member, 1935).
Buxton, John S., Contract Logger, Miranda, Calif.; Univ. of Calif., B.S.F., 1942. Northern California (Jr. member, 1942).
Case, Paul C., U.S.F.S., North Fork, Calif. Northern California (Jr. member, 1936).
Charlton, James W. H., Tbr. Mgmt., Shasta Natl. Forest, Mt. Shasta, Calif. Northern California (Jr. member, 1938).
Dasmann, R. E., Asst. Forest Supv., Tahoe Natl. Forest, Nevada City, Calif. Northern California (Jr. member, 1935).
Deitz, Glen L., Stirling City, Calif. Northern California (Jr. member, 1942).
1930. Washington (Jr. member, 30R49).
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Gordon, D. T., Silvic., Calif. Forest & Range Exp. Sta., Berkeley, Calif. Northern California (Jr. member, 1940).
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Meyer, William C., U.S.F.S., Redding, Calif. Northern California (Jr. member, 1935).
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Otter, John D., Asst. Forestry Engr., Calif. State Div. of Forestry, Monterey, Calif. Northern California (Jr. member, 1940).
Parsons, Bert E., Placerville, Calif. Northern California (Jr. member, 32R48).
Patty, Frank A., 774 Spruce St., Berkeley, Calif. Northern California (Jr. member, 1942).
Peterson, W. A., U.S.F.S., Quincy, Calif. Northern California (Jr. member, 1936).
Ritchie, Roy W., Box 104, Stirling City, Calif. Northern California (Jr. member, 1942).
Simpson, T. H., Susanville, Calif. Northern California (Jr. member, 1941).
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Spinney, W. W., Oakland, Calif. Northern California (Jr. member, 34R48).
Thornton, J. F., Lone Pine, Calif. Northern California (Jr. member, 1937).
VanAkkeren, J. J., Miramonte, Calif. Northern California (Jr. member, 34R40).
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Ozark.

Dingle, Richard W., Univ. of Mo., Columbia, Mo. Ozark (Jr. member, 1942).
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Washington

Melichar, C., Forester, U.S.F.S., Washington, D. C.; Univ. of Mich., B.S.F., 1928; M.S.F., 1930. Washington (Jr. member, 1931).
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Ripper, Edward E., Land Valuation Spec., Fish and Wildlife Service, Washington, D. C.; Pa. State, B.S.F., Wirka, R. M., U.S.F.S., Washington, D. C.; Univ. of Wisconsin, B.S., (Mech. Eng.), 1918. Washington (Jr. member, 1943).

Porcupine Damage to Forest Plantations

THAT porcupines may seriously damage forest trees is generally known, but little information is available as to the size of trees which porcupines feed upon. Observations in some 10- to 15-year-old Lake States plantations indicate that porcupines prefer the larger trees, particularly those over 3 inches in diameter breast high and 13 feet in height.

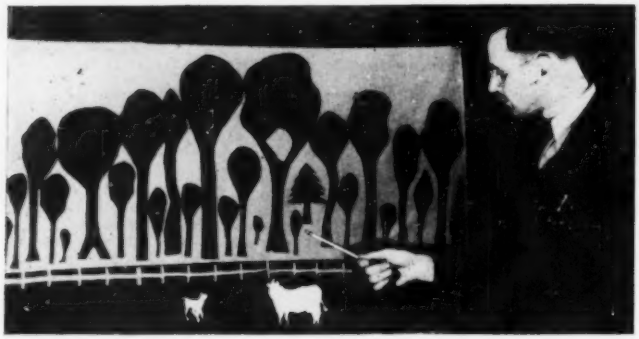
Study of a jack pine plantation in northern Wisconsin and a Scotch pine plantation in lower Michigan showed the same preference of porcupines for trees above these minimum sizes, and observations in 30- to 40-year-old plantations further corroborated the porcupines' liking for the larger more vigorous trees.

The practical value of these observations is this: Plantations of species which porcupines like, such as jack pine, white pine, or tamarack, probably will need protection—where porcupines are common—beginning about the time the trees reach 3 inches in diameter. Needs and plans for control can, therefore, be determined before damage actually starts.

PAUL O. RUDOLF,
Lake States Forest Experiment Station.

Forestry News

Compiled by ROBERT D. HOSTETTER, *Assistant Executive Secretary*



A. N. Lentz, above, demonstrates the use of a homemade flannel board, somewhat similar to the one described below, in teaching forestry to the public. Mr. Lentz is extension forester at Rutgers University, New Brunswick, N. J. The background of his display is heavy flannel, while trees, animals, and fences are cut from appropriately colored felt or flannel.

Flannel Graph Illustrates Improvement Cutting Methods

Flannel graphs have been adapted by Harry Rossoll of the Southern Region, U. S. Forest Service, for use in portraying improvement cutting procedures.

Trees of various sizes and quality are portrayed by pictures which are backed with flannelette. The tree cut-outs can be positioned as desired on a large piece of flannelette used as a background and are held there by friction.

Especially adapted for use in illustrating to groups which trees to mark for removal, the flannel graph is in demand by industrial conservation foresters, farm foresters, county agents and school teachers. Trees are positioned on the graph as desired.

A set of 27 trees can be obtained for $4.70 plus postage from the Zell Screen-Ad Co., Atlanta, Ga.

Newins Heads Tree Conference

Director H. S. Newins of the University of Florida School of Forestry was named president of the Southern Shade Tree Conference at its annual meeting held in Gainesville recently.

Safety Code Being Prepared

Special committees of the Timber Producers Association and the Northern Hemlock and Hardwood Manufacturers Association are at present formulating a safety code for use in the Michigan-Wisconsin area. This code is being prepared as a portion of the all-out program to lessen accidents in the timber industry and consequently lower the current rate of workmen's compensation insurance rates.

Texas Forest Service Changes Departmental Organization

Consolidation of six former divisions into four departments of forest management, forest fire control, forest products, and research and education has been announced by A. D. Folweiler, director of the Texas Forest Service. Respective heads of the new departments are Don Young, J. O. Burnside, E. D. Marshall, and D. A. Anderson.

All field work of the service is organized on a district basis, with six having been established. Each is under the supervision of a graduate forester who conducts the work of all four departments on a district level.

Dodd Urges Wider Wood Pulp Consumption Throughout World

Representatives of most of the major wood pulp producing and consuming nations of the world met from April 25 to May 4 in Montreal at a conference called by the Food and Agriculture Organization of the United Nations.

Norris E. Dodd, F.A.O. Director-General, at the opening session of the meeting called attention to the fact that almost 90 percent of all the wood pulp is consumed at present in North America and Europe by 500 million people, only a third of the World's population.

He also told the Preparatory Conference on World Pulp Problems that recognition of the need to achieve a betterment in living conditions for underprivileged humans of the world is rapidly being translated into a detailed program of technical assistance.

One of the most challenging tasks of the conference, he said, was to explore the practical possibilities of achieving a rapid expansion of wood pulp consumption in all its forms, especially in regions now consuming little.

Egon Glesinger, Chief of the Forest Products Branch of F.A.O.'s Forestry Division, was Secretary-General of the conference, the first of its kind.

New Hatcheries Authorized

The California Wildlife Conservation Board recently authorized the expenditure of $1,513,000 to provide for construction of seven new fish hatcheries and enlargement of two others.

They will replace 11 antiquated hatcheries where water supply is unsatisfactory or inadequate or where production costs are excessive.

Seth Gordon is serving as consultant to the Wildlife Conservation Board.

Campaign Seeks Ten Percent Reduction in Forest Fires

Promises of cooperation exceeding the $3,000,000 in radio time and advertising devoted to forest fire prevention last year by business and industrial organizations will be one means by which it is hoped that a ten percent reduction in the number of man-caused forest fires can be effected this year.

Clint Davis, director of the Cooperative Forest Fire Prevention Campaigns, stated that a ten percent reduction of man-caused fires would reduce the total number in the United States to 170,000, not including an expected 20,000 lightning-caused forest fires.

Other aids in the campaign will be the use of cancellation dies on mail, reading "Remember—Only You Can Prevent Forest Fires"; fire prevention cards in buses and street cars; spot radio announcements; and the fire prevention programs of many cooperating agencies. Commercial air lines are increasing their cooperation in reporting fires observed by pilots.

Hardwood Control Effective

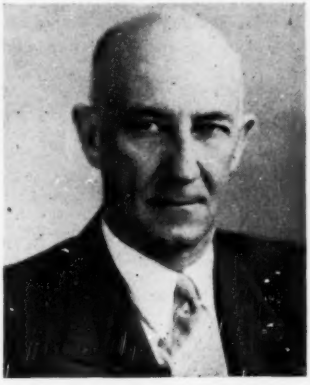
Louis C. Maisenhelder states in Circular 139 of the Mississippi Agricultural Experiment Station that sodium arsenite, in a 61.5 percent solution, is 100 percent effective in killing hardwood sprouts when applied to freshly cut stumps and in killing hardwood trees of three inches diameter and larger when applied in frills.

Also in connection with hardwood control, S. F. Clark and H. L. Williston have determined the cost of girdling hardwood trees on the Crossett Experimental Forest. Allowing 60 cents per hour for labor and 19.8 cents per hour for other expenses, the cost of girdling trees ranges from 2.2 cents for six-inch trees to 7.4 cents for eighteen-inch trees. Since shortleaf and loblolly pines have rapid growth rates, most areas need to be treated only once for them to outgrow hardwood sprouts.

McIntire Made State Forester

Promotion of George S. McIntire to state forester of Michigan was announced in April by Conservation Director P. J. Hoffmaster.

Formerly assistant state forester for 20 years, he succeeds Marcus Schaaf who retired after 39 years of state service.



GEORGE S. MCINTIRE

Mr. McIntire is a graduate of Iowa State College and is an S.A.F. Member.

He assumes charge of Michigan's 22 state forests covering 3,600,000 acres and will supervise the expanding program of cooperation with commercial forest and farm woodlot owners.

Banks Urge Loans for Forests

A movement is underway for the removal of government restrictions on national bank loans on forest lands, according to the Natural Resources Department, Chamber of Commerce of the United States. At present forest land is classified as unimproved and banned as collateral for loans by national banks. The State Bankers Associations of Florida, Mississippi, and Oregon have passed resolutions asking that the ban be removed, and the American Bankers Association has appointed a committee to study the possibilities of an amendment to the Federal Reserve Act.

Izaak Walton League Points To Conservation Crisis Spots

The Izaak Walton League of America has published a looseleaf booklet of background information relating to major problem areas in the field of conservation of natural resources. These include several basin programs, the land grab, smear of the Forest Service, Glacier View Dam, wilderness areas, pollution, exploitation of national parks, and other problems.

The booklet, prepared by Arthur H. Carhart and titled "Crisis Spots in Conservation," is available at the Denver office of the League, 327 C. A. Johnson Building, or at the national offices, 31 N. State Street, Chicago, for 25 cents.

Fifty-four general and specific resource areas are discussed, covering (1) the historical background, (2) the nature and style of threat, (3) present status of project or problem, and (4) the constructive approach.

Announcement of the booklet's release was made by William Voigt, Jr., who is now executive director of the Izaak Walton League following the resignation due to ill health of Kenneth A. Reid. Mr. Voight was formerly western representative of the League.

Girard's Autobiography Printed

"The Man Who Knew Trees," an autobiography of James W. Girard, has been published by the Forest Products History Foundation, Minnesota Historical Society, St. Paul 1, Minn.

This 35-page story of the "check cruiser of the universe" is prefaced by quotations from several letters written by men who knew Jim Girard's capacity for getting an enormous amount of work done (Volume tables of proven accuracy were prepared for five million acres in a week's time.) and who knew why he gained the reputation as one of the best woodsmen and the toughest man in the Forest Service.

Price of the booklet is 50 cents.

Forestry Legislation

Soil and Water

Senate Bills 1595, 1631, and 1632 introduced on April 14, 18, and 19 (By Cain of Washington), S. 1645 introduced on April 19 (By Magnuson of Washington), and House of Representatives Bills 3636, 4286, and 4287 (By Horan, Mitchell, and Jackson, respectively, of Washington), introduced at about the same time, all relate to the establishment of a Columbia Valley Administration or some similar plan for the development of resources in the Northwest. Recommended by a presidential message on April 13, a C.V.A. would consolidate Federal activities in multiple-purpose conservation and use of water in the Columbia River and its tributaries, but would attain development of other resources through cooperation with existing Federal, State, and local agencies.

H. R. 3181 (By D'Ewart of Montana), which provides for more effective conservation in the arid and semi-arid areas of the U. S., passed the House on May 2, 1949.

Forest Protection

S. 1659 (By Aiken of Vermont and other New Englanders) would grant the consent and approval of Congress to an interstate forest fire protection compact between northeastern states and Canada. Each state and province would have representatives on a "Northeastern Forest Fire Protection Commission" to coordinate activities and perform such common services as member states may deem advisable. Referred to Committee on Agriculture and Forestry on April 20.

Reorganization

S. 526, the Reorganization Act of 1949, which prescribes the manner in which executive branch plans for reorganization of agencies are to be submitted to Congress for consideration, was reported favorably by the Senate Committee on Expenditures in the Executive Departments on April 6.

Development

S. 851 (By Magnuson of Washington) became Public Law 52 on April 23. It is designed to promote the settlement and development of the public domain in Alaska by facilitating the construction of necessary housing therein.

Miscellaneous

During the first four months of the 81st Session, nearly 2,000 bills were introduced in the Senate and 5,000 in the House. Fifty-five public bills were enacted into law.

Forestry Yearbook Emphasizes Need for Expanded Production

Current production of wood and wood products from the world's forests is not enough to meet present needs, much less future requirements, and forest output must therefore be expanded, the Food and Agriculture Organization reported today in announcing publication of the second volume in its series of yearbooks of forest products.

The *Yearbook of Forest Products Statistics*, containing information for 1946 and 1947, estimates a world output of roundwood (logs) for 1947 of 1,450 million cubic meters. This is about 3 percent greater than the estimate of 1,410 million cubic meters for 1946. It is still approximately 3 percent below the 1937 output, estimated at 1,500 million cubic meters. Since world population has increased by about 200 millions in these 10 years, wood supplies per person are now 14 percent below those of prewar.

In North America wood consumption per person is higher than in any other region. It is apparently about three times the rate of Europe.

Southern Hardwoods Pictured

Southern Hardwood Producers, Inc., with headquarters at Memphis, Tenn., has recently released a color movie with sound which traces the harvesting and manufacture of oak, gum, pecan, and other southern hardwoods.

Centralized Gum Distillation Helps Naval Stores Industry

Today 90 percent of pine gum distillation in the United States is done in 30 large, central plants. Only 15 years ago turpentine and rosin were separated in hundreds of small, country stills. The large distilleries are more efficient and can process gum at about half the costs incurred by the small stills, according to a survey made by the Production and Marketing Administration of the U. S. Department of Agriculture.

In addition to greater efficiency the larger mills have the added advantages of production of improved rosin, ability to meet specific requirements of manufacturers by shipping naval stores in containers of the sizes and varieties the buyers prefer, and by providing a ready market for gum collected by farmers with only a few pine trees.

While finding large distilleries a big improvement over small ones, the specialists also made three suggestions for still better pine gum marketing procedures: (1) A naval stores market news service, issuing reports at least weekly, would help farmers. (2) Distillers should discontinue their practice of underestimating rosin content of pine gum—a custom followed for many years and well known at all levels of the trade. (3) Research on chemical gum-grading tests should be continued.

Mississippi Gets 84 Jeeps

A fleet of 84 jeeps has been put into action by the Mississippi Forestry Commission for fire protection covering nearly ten million acres of forest land.

Sixty-five of the Jeeps are equipped with hydraulic lifts and middle buster type plows to make fire breaks. The rest are equipped with Panama pumps and 70-gallon water tanks, a 50-foot discharge hose and 20-foot pick-up hose. All are fitted with two-way radio.

The average size of all fires in Mississippi in 1948 was 26.9 acres.

Administration Reorganized

Under the new State Constitution adopted for New Jersey last November, the multitude of State agencies have been consolidated into fifteen major departments, each under the direction of a commissioner, which commissioners constitute the Governor's cabinet. The work of Forestry, Parks and Historic Sites which has previously been handled by the Department of Conservation, has been consolidated into a new Department of Conservation and Economic Development, and has been allocated to the Division of Planning and Development, one of five divisions in the Department, as a Section of Forestry, Parks and Historic Sites of the Division, under the administrative supervision of State Forester, C. P. Wilber.

The change involves no significant alteration in policy or program under which the Forestry and Parks work has been carried on in the past. The new administrative setup became effective January 1, 1949.

Hickory Has Unusual Uses

Robert C. Buchholz, forester for the Draper Corporation at Biltmore, N. C., reports several unusual uses for hickory. These include bristles for street-sweeping brooms made from hickory veneer sheets chopped into shreds; sucker rods made from long, straight-grained pieces and used in boring wells; and in the manufacture of pallets used for transferring castings.

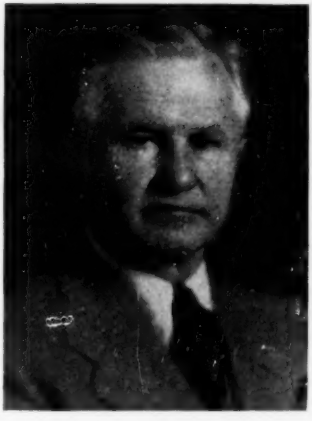
Israel Needs Forestry Books

A. Y. Goor (ex Grasovsky), a Yale forester, is now Conservator of Forests at Nathanya, Israel. He is endeavoring to enlarge the library of the Department of Forests and will welcome books or magazines on forestry from foresters in the United States.

Copies of Society publications still in print were contributed by the S.A.F. office.

Helsinki Forestry Delegates Take Pre-Congress Excursions

A dozen excursions for delegates have been scheduled for the three days preceding the Third World Forestry Congress to be held in Helsinki, Finland, from July 10 to 20, 1949. Trips are planned to various parts of Finland where observations can be made of different methods of forest regeneration and thinning, the forest foremen's



C. M. GRANGER

training school run by timber companies at Sulkava, floating equipment and sorting of timber in the Kokemaenjoki River, sawmills and joinery plants, pulp mills, soil radiation experiments, silviculture experiments of foreign tree species, tourist attractions, and many other places of interest.

Heading the official United States delegation will be C. M. Granger, a former president of the Society of American Foresters. Other official delegates are: Tom Gill, E. C. Crafts, George A. Garratt, Corydon Wager, and H. M. Seaman.

Also attending will be Nicholas Muhlenberg, Hardy Shirley, Joshua A. Cope, H. C. Berckes, I. T. Haig, Leonard Barrett, Ira Mason, J. Herbert Stone, Scott S. Pauley, J. W. Mattern, Harry A. Lowther, John D. Tughrie, Russell Watson, J. H. Stoeckeler, M. C. Johnson, Matt Niewenhous, Ellen C. Dowling, Q. T. Hartner, George Fuller, Oliver D. Diller, and wives of several delegates.

Sections devoted to silviculture, surveys, economics, utilization, and industries will precede the plenary sessions of the Congress which will consider forest resources and wood requirements, integrated wood utilization, and coordination of the sections' recommendations.

Oak Decay Resistance Varies

Decay and toxicity studies made by Robert A. Zabel at the New York State College of Forestry indicate that important durability differences occur between different individual trees of the same species of three white oaks. He suggests that trees highly resistant to decay could be advantageously propogated by cuttings. Results indicated that the tannins exert toxic effects on fungi growing in white oak.

Distinct differences in durability with respect to radial position in the bole were also found in the white oaks. Veneer for plywood staves from the outer portions of the heartwood would be more desirable since durability is a factor in cask staves.

Increased resistance to decay occurred progressively from the pith through the outer heartwood.

Tree Farms Get Signboards

Weyerhaeuser Timber Company, which organized the nation's first tree farm in 1941, has initiated a program to place identifying signboards adjacent to major highways which pass through the firm's present twelve certified tree farms in Oregon and Washington.

In less than eight years the tree farm program has been adopted nationally by over 1,700 timberland owners in 23 states, managing 17½ million acres of private forests.

Certified tree farmers must maintain a designated area of land for permanent production of forest crops; protect the area from fire, insects, disease and excessive grazing, and harvest the timber in a manner which will assure future crops.

Science Interpretation Award Offered to Magazine Writers

Announcement of the third AAAS-George Westinghouse Science Writing Award for magazine writers has been made by the Westinghouse Educational Foundation and the American Association for the Advancement of Science, joint sponsors.

A $1,000 award will be made to the person writing the winning magazine article. Entries will be judged on initiative, originality, scientific accuracy, clarity of interpretation, and the story's value in promoting a better understanding of science by the public.

Entry blanks for the contest which closes on October 8 can be obtained from the S.A.F. national office.

SCS Foresters Meet in South

During the last week of March, divisional foresters of each of the seven regions of the Soil Conservation Service assembled at Shreveport, La., for a week of field examinations and conferences that closed at Texarkana, Tex.

The group from the field included: Arthur C. McIntyre, Upper Darby, Pa.; J. A. Gibbs, Spartanburg, S. C.; Stanley S. Locke, Milwaukee, Wisc.; Homer C. Mitchell, Ft. Worth, Texas; Ross A. Williams, Lincoln, Nebraska; Clarence Svendby, Albuquerque, N. M.; and T. B. Plair, Portland, Oregon. Arthur R. Spillers of Washington office, Forest Service, spent part of the week with the group. John F. Preston, together with C. B. Manifold, represented the Washington office of the Soil Conservation Service. Lloyd P. Blackwell, head of the forestry department at Louisiana Polytechnic Institute and staff members Harold E. Gustin and Ernest J. Russell, were also with the group for a day. The district forester of the Illinois Central Railroad, along with field and regional staff men of Soil Conservation Service, spent periods with the group.

The major object of the meeting was to examine at various locations the application of simplified woodland management practices. Selective cutting and thinning are being controlled by using the D+6 formula in southern pine. Additional items of importance to workers with farmers included systems of annual harvests and control of hardwoods. Well managed woodland was demonstrated as an important factor in full and conservative use of the resources of the farm.

A half-day was spent with Russell R. Reynolds on both Farm Forestry Compartments and other units at the Crossett Experimental Forest.

Tract Acquired from WAA

Lee K. Paulsell, a 1949 graduate from the University of Missouri, has been appointed as forester for the Weldon Springs Experimental Farm. This 8,000-acre tract, acquired by the University of Missouri Department of Forestry from the War Assets Administration, supports 6,000 acres of forest. The area provides a unique opportunity for coordinating timber use with various agricultural activities. A program of research and demonstration in forestry will be carried out.

This area, together with the University Forest near Poplar Bluff, gives the forestry department 15,000 acres of timberland under its administration.

Practices What It Preaches

Governor William M. Tuck of Virginia has requested that all departments in the state organization owning forest land determine and carry out proper management practices on those areas.

The Virginia Forest Service, directed by State Forester George W. Dean, will cruise, mark, and inspect timber tracts; contact purchasers; and assist in reforestation where it is needed on state-owned land as well as on private land.

Aerially Sown Longleaf Pines Survive in Louisiana Forest

Longleaf pine seedlings on 1,250 acres of land in the Breezy Hill area of the Kisatchie National Forest in Louisiana have shown good survival following aerial seeding last November 22.

The area reseeded was used by the Army during the war as an artillery and mortar shell impact area, after having first clear-cut all the timber. Because of the danger of striking live shells in hand or mechanical planting, aerial seeding was used.

After burning to reduce rodent populations and to provide a mineral soil seed bed, 3,690 pounds of seed were scattered by a commercial pilot with 22 years of cotton dusting experience.

Harry R. Tomlinson, who was in charge of the project, said that if the seedlings survived this summer's dry weather the experiment could be considered successful. They have so far escaped destruction by birds and prompt poisonng of Texas Town Ants removed those pests.

Nut Research Recommended

An edible pectinate derived from orange peelings and apple pomace, in which salt and coloring can be incorporated, is being developed to coat nuts to provide a more attractive product.

That and other marketing and producing aids were recently recommended for work under the Research and Marketing Act by the Tree Nut Advisory Committee.

Planes Spray DDT for Bugs

Insect control operations involving the use of DDT-spraying airplanes are being conducted this summer against the gypsy moth from Pennsylvania northward, against the spruce budworm in Oregon and Maine, and against grasshoppers in Montana and Wyoming, according to the Bureau of Entomology and Plant Quarantine.

Fire Detection Equipment Proposed for High Balloons

Moored barrage balloons similar to the type used during the war, but specially outfitted with radar and infra-red detection equipment to relay information to an observer on the ground, may offer a possibility for better forest fire detection, according to physicists at McGill University, Montreal.

At an elevation of 15,000 feet, 15 such balloons would cover Canada's 300-mile wide forest belt from New Brunswick to British Columbia.

(Editor's note: Much of the romance of forestry will be gone forever when the intrepid lookout, from the comfort of an easy chair in his urban living room, searches for telltale wisps of smoke on a television screen!)

Tests Promise Fever Cure

Two new antibiotics, aureomycin and chloromycin, have been discovered which show promise of effecting cures for Rocky Mountain spotted fever.

Neither drug has been completely tested although excellent results on 20 cases are reported. The tick-transmitted fever presents one of the most feared hazards of outdoorsmen in a large part of North America.

While reluctant to predict that these drugs will cure tularemia as well, the U. S. Public Health Service indicates that good results have been obtained in experiments with infected animals.

Ties Last Thirty-Five Years

Thirty-five years was the average service life of 261 cottonwood ties (*Populus trichocarpa*) on the Bitterroot branch line of the Northern Pacific Railway Company near Lolo, Mont. The ties used in the experimental installation were treated with a mixture of 80-percent grade 1 coal-tar cresote and 20 percent refined coal tar.

Paint Bombs Mark Treetops

W. J. Buckhorn of the Forest Insect Laboratory, Portland, Ore. is shown below demonstrating a line-throwing gun which he developed for use in marking treetops to guide airplane pilots in spraying operations.

Using an 1873 model Army Springfield, .45-.70-caliber; a foot long, six-ounce brass projectile with twine attached is fired from the sawed-off barrel over the top of the tree to be marked. Next the line is used to hoist a paint bomb made from a waxed paper ice cream container filled with paint in which a capped quarter of a stick of dynamite is placed.

Electrically detonated, the bomb splatters paint over the treetop in a manner that is readily visible.

Deer Repellent Developed

Fruit orchard owners and farmers, weary of deer nibbling on trees and crops, soon will be able to purchase a new deer repellent which has been tested by the state of Maine and found effective under certain conditions.

Compounded by a former Michigan conservation department biologist, Luther Baumgartner, the repellent, when eaten by the deer, apparently causes throat discomfort.

Manufactured by the chemical division of one of the large rubber companies, the deer repellent is expected to be offered by orchard and farm supply stores at a price comparable with regular orchard sprays.

Junker Says Intensive Care Will Double Douglas-Fir Yield

Possibilities of intensive forest management in the Douglas-fir region of the Pacific Northwest were discussed at the annual Weyerhaeuser Timber Company forestry meeting in Tacoma, March 31 and April 1, by Fleming Juncker, eminent Danish forester.

Juncker, who manages his own 51-year-old Douglas-fir plantation in Denmark, as well as many acres of personally owned spruce, claimed intensive forestry management of the Pacific Northwest's young Douglas-fir stands would double the ultimate yield from these forests. Juncker stated that in his country it was customary to thin forests annually after the fifteenth year.

Eighty-nine representatives of timber companies and public forest agencies attended the meeting, which has been held every year except one since 1942. The conferences were instituted to serve as a clearing house for forestry problems and progress between branches of the Weyerhaeuser Timber Company, and between Weyerhaeuser and other forest interests, both public and private, faced with similar problems.

Interior Has Fewer Fires

Only about two-thirds as many fires burned in 1948 on lands administered by the Fish and Wildlife Service, National Park Service, Bureau of Indian Affairs, and Bureau of Land Management in the Department of Interior as was the average number during the 1942-1947 period. Most notable were the Bureau of Land Management and Fish and Wildlife Service which held their losses to a record low.

Acreage burned in 1948 was 320,646 acres as compared with the average for the preceding six year of 1,433,715 acres.

Man-caused fires constituted about two-thirds of the total, and of them half were caused by careless smokers.

Low-Quality Hardwoods Used To Manufacture Roofing Felt

Wood chips produced from low-quality hardwood stands and from slabs, edgings, veneer cores and waste, and broken blockwood from remanufacturing plants are currently being used in the Central States region for the production of coarse fiber used by the asphalt roofing industry.

Costs of operating a small plant chipping wood for shipment by rail vary from $1.00 to $1.50 per ton, according to James T. Morgan in Technical Paper No. 111 issued by the Central States Forest Experiment Station. Initial investment for chipper, motor, and blower amounts to about $9,500 for a plant capable of producing 1200 tons of chips per month from roundwood.

Syracuse Offers Fellowships

The New York State College of Forestry expects to offer 21 fellowships for the college year 1949-1950. These fellowships carry stipends varying from $585 to $1,450 for a nine-months' period, and are available to students pursuing study leading to the Master of Forestry, Master of Science, and Doctor of Philosophy degrees.

Recipients may specialize in the following fields of forestry and forest products; forest boany, forest entomology, forest zoology, wildlife management, silviculture, forest management, forest administration, photogrammetry applied to forestry, landscape and recreational management, wood technology, forest products' manufacture and utilization, pulp and paper manufacture, and wood chemistry and plastics.

Wildlifers Head West in 1950

The 15th North American Wildlife Conference will meet in the Fairmont Hotel in San Francisco, March 6, 7, and 8, 1950.

This will be the first time that one of the conferences has been held west of Denver, Colo.

Apiarists Compete for Range

L. F. Abel reports that besides serving as range for cattle, sheep, and deer, the sage and bitter-bush slopes in the Inyo National Forest in California also serve as a range for bees, adding another angle to multiple-use forestry.

Ten thousand bee hives, with a total valuation of $120,000, are located each spring along the front ranges of the Sierras. The bees produce an annual 300 tons of honey, valued at 10 or 12 cents a pound, or approximately $70,000.

When a fire occurs in the front country, the bee men are among the first volunteers to help. There is considerable competition for apiary sites. Rules and regulations have been set up to prevent "overgrazing" the bee range.

The Honey and Pollen Plants Committee of the American Beekeeping Federation will hold its annual meeting from July 12 to 15 on the University of Washington campus at Seattle.

John Pearce (1908-1949)

John Pearce, formerly director of Region 5 of the Fish and Wildlife Service died on April 8, 1949, after a long illness.

Born in 1908 in England, he became naturalized in 1929. He received professional training in wildlife management at New York State College of Forestry, receiving an M.F. degree in 1935.

By request, flowers were omitted at his funeral, memorial donations being made to the American Cancer Society.

Fires Speedily Controlled

Using a jeep equipped with a Universal plow, an assistant ranger employed by the Louisiana Forestry Commission records his average fire suppression time as 1½ minutes per acre of fire.

Records were kept on fires of from 15 to 40 acres in size where mechanized attack was possible. Time was computed from dropping to raising the plow.

TECO Develops New Process For Pulping Hardwood Waste

Hardwood sawmill wastes many now be utilized on an economical basis to make pulp. Announcement of the new process was made by Timber Engineering Company.

The process is said to be so simple that no pressure digesters are needed, the entire procedure being accomplished in an open cooking vat. Wood is chipped to a smaller size with this new process, the size being no larger than a match stick. This also allows for more complete utilization of the sawmill wood wastes. The process is applicable to any hardwood.

TECO said that with the new process pulp yields range from 80 to 90 percent of the original wood. Three years went into research on the project before the simple process was evolved.

The pulp can be commercially used for corrugated board, insulating and hardboard, and possibly for making roofing felts. Patent application on the process is owned by the Hardwood By-Products, Inc., Huntington, West Virginia.

Foresters' Ranks Show Gains

More than 300 foresters are currently employed in Michigan, Wisconsin, and Minnesota as compared to only 45 in 1923, according to the Lake States Forest Experiment Station, headquartered at St. Paul since that time.

This year's crop of graduates will raise the total number of foresters educated in the United States to over 15,000.

Timber Sale Officer Promoted

Harlan C. Hiatt has been placed in charge of the timber disposal unit of the division of timber management of the Pacific Northwest Region, U. S. Forest Service, with headquarters in Portland, Ore. The position was formerly filled by Walter H. Lund, who was recently promoted to chief of the division.

Demand for Tree Seedlings Exceeds Every State's Output

Reports from the State nurseries, 74 of which are cooperatively financed by State and Federal forest services under the Clarke-McNary and Norris-Doxey Acts and 5 other state nurseries, show that some 156,000,000 trees have been distributed or promised to applicants for delivery this year at cost. This marks the largest annual distribution of tree planting stock from these nurseries since 1941 when an all-time record was established in the 23-year-old Federal-State reforestation program. In that year 181,000,000 trees were distributed. The number of seedlings already distributed or promised to planters this year is almost double the 1948 distribution of 84,780,000 seedlings. State foresters expect that 325,000,000 trees will be available for distribution next year.

State nursery production was greatest in Georgia with 19,593,000 seedlings in 1948, and with a goal of 34,500,000 for 1949.

While final planting reports have not yet been received from all state and federal agencies, it is estimated that 250,000 acres were reforested last year, bringing the area of reforested land in the entire country to about 5,400,000 acres. Not available as yet is the total of acres planted last year by lumber and pulp and paper companies which during the past few years have established an increasing number of their own nurseries, particularly in the Pacific Northwest and the South, for the purpose of replanting their own lands which haven't naturally reseeded. Over 46,000 acres were planted by federal agencies in 1948.

Fire Film Wins Safety Award

"Then It happened," a Forest Service documentary film based on the Maine fires which occurred in the fall of 1947, has been awarded a "Safety Oscar" as the best 1948 motion picture in the field of general safety by the National Committee on Films for Safety, a division of the National Safety Council.

Hydraulic Skidding Attachment Functions as Arch

A hydraulically-controlled skidding attachment built by a logger is in effective operation on tree-length skidding in Minnesota. The attachment performs the same function as an arch in raising the forward ends of logs to reduce friction when skidding.

The attachment consists of a horizontal draw bar, a vertical brace, and a movable arm. It is easily mounted the same way as other agricultural attachments, and does not interfere with the use of the tractor for other purposes. This feature is particularly advantageous to farm woodlot owners.

Chain chokers are used because their used length can be varied as log size and skidding conditions dictate. After the choker is attached to the log, one of the links on the loose end is dropped into a slot on the draw bar, thus securing the load.

Douglas-Fir Manual Published

A comprehensive manual on the properties, uses and grades of Douglas-fir of the western pine region has been issued by the Western Pine Association.

The new publication is the third in a series of species books published by the association in the past year.

The most recent survey places the standing Douglas-fir sawtimber inventory at 101,552,000,000 board feet. Production is averaging approximately one billion feet per year.

Full page pictures of typical pieces of each grade are accompanied by text material describing the pictured examples together with a general outline of the grading rules.

Indexed, the book carries a listing of standard manufactured sizes and an alphabetical catalogue of uses of Douglas-fir and recommended grades therefor.

Eucalypts Suitable for Paper

A large and thriving industry, based on the utilization of eucalypt hardwoods for the manufacture of high-quality papers of all grades, has been established in Australia as the result of research which extended over a quarter of a century, according to W. E. Cohen.

Although eucalypt fibers are short, they are proportionally thin and consequently their felting properties are not impaired. They have a far more important use in papermaking than that of the usual run of oversea hardwood pulps, which are used largely as "fillers." Newsprint furnished with eucalypt groundwood possesses excellent printing properties which, rather than strength, are the most important criteria.

Australia lacks softwoods from which to derive long-fibered pulps and has had to import from the Northern Hemisphere. New Zealand will soon supply Australia's long-fiber needs from plantation-grown *P. radiata*.

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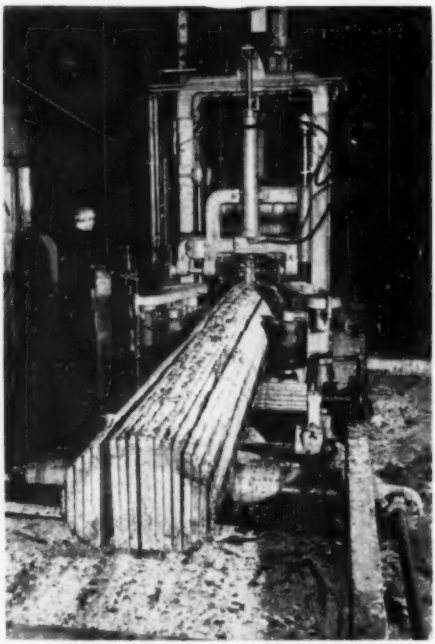

46% Overrun on Salvaged Small Logs

"The first four-hour run was for small logs (10" and under). During this period 273 logs went through the mill which scaled 11,820 board feet gross log scale and 10,580 board feet net scale. From these logs 15,417 board feet of lumber was produced which gave an overrun of 46%."

Above is quoted from a government utilization study on operations of the Dwyer Lumber Co., Portland, Ore. Having replaced a portable circular mill with a "Swede" gang mill, Dwyer also increased its band mill production 10%. Fire protection has been simplified with cleaned up woods. Log yield from a given area is up 25%. For complete details write

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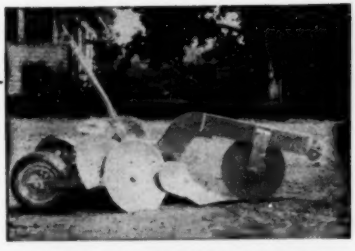

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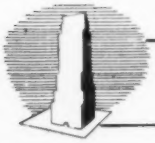

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